Vol. 1 JULY, 1917 No. 5

LIBRARY
BOSTON UNIVERSITY
SCHOOL OF MEDICINE

THE AMERICAN REVIEW OF TUBERCULOSIS

JOURNAL OF

THE NATIONAL ASSOCIATION FOR THE STUDY AND PREVENTION OF TUBERCULOSIS

EDITORIAL STAFF

EDWARD R. BALDWIN, Saranac Lake, N. Y.
Editor-in-Chief

LAWRASON BROWN, Saranac Lake, N. Y.
H. R. M. LANDIS, Philadelphia, Pa.
PAUL A. LEWIS, Philadelphia, Pa.
M. J. ROSENAU, Boston, Mass.
HENRY SEWALL, Denver, Col.
BORDEN S. VEEDER, St. Louis, Mo.

ALLEN K. KRAUSE, Baltimore, Md.
Managing Editor

PUBLISHED MONTHLY

AT 2419-21 GREENMOUNT AVE., BALTIMORE, MD.

BY THE NATIONAL ASSOCIATION FOR THE STUDY AND PREVENTION OF TUBERCULOSIS

Entered as second class matter March 9, 1917, at the post office at Baltimore, Maryland, under the Act of August 24, 1912

Copyright 1917 by the National Association for the Study and Prevention of Tuberculosis

The Administration of Tuberculin

¶ The scientific administration of tuberculin requires the most careful and exact clinical observations in order to prevent over-dosage.

¶ The observations must extend over a considerable time following the injection, and it has been found in practice that the record of symptoms during this period can be best kept by the patients themselves.

¶ A chart to be filled in by the patient affords the only safe and satisfactory method of reporting, since there is space for every symptom can be provided and errors of memory and personal point of view be eliminated.

¶ Such a record enables the patient to explain more clearly his condition after a dose of tuberculin, and enables the physician who is administering the tuberculin to graduate more carefully and properly the dosage.

¶ The ideal form is found in the ***Tuberculin Record*** published by the JOURNAL OF THE OUTDOOR LIFE. The book provides space for forty-two weeks, gives a sample chart properly filled out, and also two pages of instruction and advice to the patient about the necessity for absolute honesty and co-operation with the physician.

¶ The ***Tuberculin Record*** has gone through nearly a dozen editions. It has been extensively used at the Trudeau Sanitarium, at the Loomis Sanatorium, at Otisville, and at many other Sanatoriums, by tuberculosis clinics, day camps, dispensaries, hospitals, and by private practitioners.

¶ Price 15 cents each, singly or in quantities.

JOURNAL OF THE OUTDOOR LIFE

289 Fourth Avenue, New York City

"To be certain—burn-it-all"

Superior Advantages of Our No. 5 Sputum Cups

1. You can burn entire cup.
2. Cups are constructed along expert lines with aid of prominent physicians.
3. Easily removed from holder.
4. Holder of superior quality and ease of use.
5. Packed in dust-proof carton, 20 to box.
6. All goods carefully inspected for quality.
7. Prices are right.

Other Burnitol Products

Sputum Cups, flat and wire-stitched

Sputum flasks	Paper towels
Sputum test boxes	Paper drinking cups
Paper cuspidors	Absorbent gauze
Toilet papers	Absorbent cotton

Waxed bags, etc., etc.

Write for Samples and Price List

BURNITOL MANUFACTURING CO.

37 No. Market Street
CHICAGO, ILL.

Everett, Station
BOSTON, MASS.

Associate Editors

Robert H. Babcock
Chicago, Ill.

W. Jarvis Barlow
Los Angeles, Cal.

Hermann M. Biggs
New York, N. Y.

Rupert Blue
Washington, D. C.

S. G. Bonney
Denver, Col.

Vincent Y. Bowditch
Boston, Mass.

Walter Brem
Los Angeles, Cal.

Philip King Brown
San Francisco, Cal.

George E. Bushnell
Fort Bayard, New Mex.

John W. Churchman
New Haven, Conn.

Hoyt E. Dearholt
Milwaukee, Wis.

Lydia M. DeWitt
Chicago, Ill.

H. Kennon Dunham
Cincinnati, Ohio

Livingston Farrand
Boulder, Col.

A. H. Garvin
Ray Brook, N. Y.

Louis V. Hamman
Baltimore, Md.

John B. Hawes, 2nd
Boston, Mass.

Henry Barton Jacobs
Baltimore, Md.

Arnold C. Klebs
Washington, D. C.

S. Adolphus Knopf
New York, N. Y.

George M. Kober
Washington, D. C.

E. Libman
New York, N. Y.

John H. Lowman
Cleveland, Ohio

David R. Lyman
Wallingford, Conn.

George Mannheimer
New York, N. Y.

Thomas McCrae
Philadelphia, Pa.

O. W. McMichael
Chicago, Ill.

Alfred Meyer
New York, N. Y.

James Alex. Miller
New York, N. Y.

Charles L. Minor
Asheville, N. C.

Roger S. Morris
Cincinnati, Ohio

Eugene L. Opie
St. Louis, Mo.

Edward O. Otis
Boston, Mass.

George T. Palmer
Springfield, Ill.

William H. Park
New York, N. Y.

Francis W. Peabody
Boston, Mass.

Richard M. Pearce
Philadelphia, Pa.

Joseph H. Pratt
Boston, Mass.

Mazÿck P. Ravenel
Columbia, Mo.

Samuel Robinson
Rochester, Minn.

Leonard G. Rowntree
Minneapolis, Minn.

Theobald Smith
Princeton, N. J.

Walter R. Steiner
Hartford, Conn.

Gerald B. Webb
Colorado Springs, Col.

Richard Weil
New York, N. Y.

William H. Welch
Baltimore, Md.

William Charles White
Pittsburgh, Pa.

Gordon Wilson
Baltimore, Md.

M. C. Winternitz
Baltimore, Md

CONTENTS

HERMANN M. BIGGS: A War Tuberculosis Program for the Nation 257
JABEZ H. ELLIOTT: Lessons from Canada's War Experiences with Tuberculosis 267
FRED H. HEISE: Prognosis in Tuberculosis from the Standpoint of the Occurrence of Hemoptysis and Tubercle Bacilli in the Sputum 280
MYER SOLIS-COHEN: A Study of the Signs and Symptoms of Autonomic Disturbance Occurring in Pulmonary Tuberculosis 289
Medical Notes, Abstracts and Reviews 309

THE AMERICAN REVIEW OF TUBERCULOSIS is issued monthly about the 20th of the month. Each volume consists of approximately 700 pages. The volumes begin with the March number.

The subscription price of the REVIEW to members of The National Association for the Study and Prevention of Tuberculosis is $2.00 per volume, and to non-members of the National Association, $3.00 per volume. Twenty-five cents extra should be added for Canadian and fifty cents extra for foreign postage. Subscriptions may be sent to 2419 Greenmount Avenue, Baltimore, Md., or to The National Association for the Study and Prevention of Tuberculosis, 105 East 22d Street, New York City. Checks should be made payable to William H. Baldwin, Treasurer.

Manuscripts should be sent to the office of the Managing Editor, Dr. Allen K. Krause, Johns Hopkins Hospital, Baltimore, Md. Manuscripts should be typewritten on one side of the page only. The publishers will not be responsible for manuscripts lost in transit. In order to save expense for authors' corrections in proof, the manuscripts should be carefully revised by the authors before submission.

Fifty reprints of articles will be furnished to contributors free of charge when requested in advance. A table showing cost of additional reprints, with an order blank is submitted with proofs to the author.

Advertising rates will be sent on request. The publishers reserve the right to decline any advertising submitted and to censor all copy.

The price of single copies of THE AMERICAN REVIEW OF TUBERCULOSIS is thirty-five cents.

False Economy

usually breeds an act of indiscretion when purchases are made.

This applies more forcibly in the buying of instruments of precision than with other commodities.

Hence the advisability of analytical perception, and the ignoring of price consideration when the purchase of a Clinical Thermometer is intended.

The **B-D** Saranac Clinical possesses the qualities which are essential to correct functionary performance and to your requirements.

It is not a "low-priced" Clinical because it is not made for that basis of selling. Its price represents its worth and it is false economy to pay less for a clinical which is not its equal in any viewpoint of values.

Made and controlled by

Becton, Dickinson & Co.

Rutherford **New Jersey**

A WAR TUBERCULOSIS PROGRAM FOR THE NATION[1]

HERMANN M. BIGGS

The military operations in Europe during the great war now in progress have presented a remarkable experimental confirmation on a large scale of certain fundamental facts with relation to the development and extension of tuberculosis, facts which most of us have believed to be true but which have often been disputed.

I would refer both to the conditions under which tuberculosis has developed in the army and among the civil population of the countries at war, and the methods of extension of the disease and also to the conclusions which may be drawn from what has occurred with reference to its epidemiology. It may be said in passing, that all of the great epidemic diseases which have acted as deadly scourges to the armies in the field in most former wars have now been brought practically under control by the application of modern preventive measures. Typhoid and typhus fever, smallpox, cholera, bacillary dysentery, cerebro-spinal meningitis and similar diseases have prevailed only in certain isolated localities at certain definite times when and where the application of preventive measures have been ignored, neglected, or rendered impossible because of existing conditions.

So far as I know, tuberculosis has never before played a very large part in the sanitary history of any great war, but it is playing such a part in the present struggle. While most of us have believed and strongly maintained that the modern popular antituberculosis campaigns so widely carried on in this country and in Great Britain and Germany, and the public health measures which have been adopted in most English speaking countries, have been responsible for the steady and continuous decline that has taken place in the rate of sickness and death from this disease—I say, while most of us have strongly believed this to be the fact, this opinion has been vigorously opposed. The conditions in Europe lend strong confirmation on a very large scale to our views.

[1] Read at a meeting of the Advisory Council at the Thirteenth Annual Meeting of the National Association for the Study and Prevention of Tuberculosis, Cincinnati, Ohio, May 9, 1917.

For many years in England an active antituberculosis campaign has been carried on, and there has been a steadily and constantly decreasing death rate from the disease. The death rate from pulmonary tuberculosis there is now about one per 1000 of the population, as compared with one and a half in New York State and three in France. England has the lowest tuberculosis rate of any of the great countries of the world. In contrast to England, France had done practically nothing before the war for the prevention of tuberculosis. Such antituberculosis movements as had been undertaken were local and sporadic in character and were solely the result of private initiative. The sanitary authorities had never taken official cognizance of the disease and notification of it is not required anywhere in France even now. There had been no provisions for institutional care either of early or advanced cases, and but few dispensaries.

At the beginning of the war there were only 1000 sanatorium beds in the whole of France for tuberculosis and these were in private institutions. There was no provision for the care of advanced cases excepting as they were received in the general wards of the general hospitals. (You will recall that this method of care was prohibited more than twenty years ago in New York City.)

The death rate from tuberculosis in France has been continuously high, and especially high in the cities, and has decreased slowly and but little. For the whole of France before the war it was nearly three per 1000 and in many of the cities it was much higher. In some cities, as for example, in Havre, the death rate last year was more than three times that of New York City and the tuberculosis death rate alone of Havre was equal to 40 per cent of the total death rate from all causes in New York City.

With such conditions existing among the civil population of France in 1914 it would have been possible to have anticipated to a large extent the precise results that have followed. With pulmonary tuberculosis thus widely disseminated in the general population, France mobilized a great army with great rapidity and without thorough physical examination of those enrolled. Under the stress of the situation such examinations were impossible and consequently a large number of early, latent and arrested cases of pulmonary tuberculosis were mobilized. Many men thus enrolled in the army rapidly developed pulmonary tuberculosis in the preliminary training camps, while still more broke down with

active disease when subjected to the strains and hardships incident to life at the front.

I think few of us realize how different are the living conditions imposed on the troops by modern warfare from those obtaining in most previous wars. They are absolutely unlike those which we are accustomed to associate with an army in the field. We think of armies as living in tents in the open air under the best hygienic conditions, at least so far as light, fresh air and life in the open are concerned. In France during the present war quite the reverse of this has been the case. The troops, instead of living in tents and in the open air, when they go to the front live in trenches, often wet and always damp and cold, or they are in dugouts underground, still more damp and colder. When relieved from duty on the front fighting lines, they are billeted in peasant houses in towns and villages or in farm houses and outbuildings near the front, in very much overcrowded rooms without ventilation or fresh air or sunlight, and even with little diffuse daylight. These peasant houses in France are provided with few windows and doors and such as they have are rarely open, owing to the strong national aversion of the French people to fresh air. In other words, the French troops are at all times, excepting when on march, living under unfavorable hygienic conditions, those under which tuberculosis is especially likely to be transmitted. Generally speaking also the peasants from whom the soldiers are largely drawn are not cleanly.

The results, as I said, are exactly what one would have anticipated, the development of tens of thousands of cases of tuberculosis among the troops. By the end of December, 1915, 86,000 soldiers had been returned to their homes with active tuberculous disease. In February of this year it was estimated that about 150,000 had thus been returned, and more are constantly being discharged for this cause.

The history in France has been repeated, I believe from such data as are obtainable, in Austria, Hungary and Russia, and to a less extent also in Germany. England alone has not suffered to any great degree and this is because, first, of the low prevalence of the disease in the civil population of England previous to the war; second, because the army was mobilized deliberately, and careful physical examinations were made, and those applicants who had suspicious histories or signs were excluded; and third, because the English troops live under distinctly better conditions at the front than do the French, because as a nation they are fond of fresh air and outdoor life.

What has occurred in the army has also occurred among the prisoners of war, especially the prisoners of war in Germany, who have been greatly undernourished and overcrowded and have lived under the most unhygienic conditions, and it has also occurred among the French and Belgian refugees and among the civil prisoners of war in Germany and, to a less extent, in the general civil population of all the countries at war. All the medical reports received from these countries record a great increase in the number of cases of tuberculosis in all classes of the population, especially among the young, and there is added the history of many cases in whom the disease had long been arrested where it has again become active.

How enormous the problem is in France one begins to realize when we attempt to estimate the number of cases, as nearly as may be, which would be found in various groups of the population if the war were to be terminated at once.

We have, first, about 150,000 discharged soldiers with tuberculous disease. Second, it has seemed to me that an estimate of 3 or 4 per cent of the population as tuberculous among the people who formerly lived in the Departments of France which have been in German occupation would be a very conservative estimate. As this population before the war was about 4,250,000, we may perhaps safely say that there are at least 125,000 more cases among these people.

Remember in the Departments of France, which are occupied by the Germans, or were until the recent retreat, there were before the war about 4,250,000 people. About one-half of these, 2,000,000 people, fled from their homes before the first German invasion. After the battle of the Marne and the establishment of the western lines, which have been held so long, these refugees were scattered along the front in the villages and towns situated nearest to their previous homes, and a good many of them remained in Paris, which was not far from the front. Remember that at one time the German army was only fourteen miles from Paris, and that even during the past winter the nearest point of the lines was only about forty miles from Paris. These 2,000,000 people have been living in the villages and towns near the lines under the most unfavorable conditions. They were homeless and absolutely without resources and dependent entirely upon relief organizations for their living. There has been an enormous amount of tuberculosis among them, how much, of course, it is impossible to determine accurately.

In addition to these there are about 2,250,000 people back of the Ger-

man lines, civilian prisoners in Germany who are living partly in their homes, partly in concentration camps, and partly have been deported into Germany. Practically all of those in the middle age of life, both men and women, between the ages of 15 and 45, have been deported into Germany, and the rest, young or old, are either in concentration camps or still in their homes. Of these, large numbers are being returned from time to time to France, either as they become ill and in bad physical condition and are a serious burden upon their captors, or when some military operations which are being contemplated render it desirable to evacuate the portion of the territory they occupied. When we were in France about 1000 a day were being returned through Switzerland by Geneva, and these people came back in the most deplorable condition. Of 20,000 of these civilian prisoners first returned, it was said that 5000 were suffering from tuberculosis. They were returned in the middle of the year, 1915, in July and August. They had been back of the German lines for about eight months and the majority of them had had no change of clothes from the time they had been taken from their homes. They had been kept in Germany for seven or eight months and had been returned to France with the same clothes on, which they wore when they left France seven or eight months before. You can readily imagine what the condition of these people was. It seems that an estimate that 3 or 4 per cent were suffering from tuberculosis is probably a very conservative one.

Third, there are now between 350,000 and 400,000 French prisoners of war in Germany. It seems wholly conservative to estimate that at least 5 or 6 per cent of these are suffering from tuberculosis (the French estimates run as high as 30 or 40 per cent). This would give over 20,000 more cases.

Fourth, there are now probably more than 4,000,000 men in the active army of France and cases are still being discharged from the army. It is perhaps safe to estimate that at least one-half of 1 per cent of men in the army are suffering with the disease, or will be at the termination of the war. This would give 20,000 additional cases.

Fifth, there were more than 100,000 deaths annually from tuberculosis of all forms in the whole of France before the war. If we estimate the number of cases in the civil population on the basis of deaths occurring annually, and allow only two cases for each death from tuberculosis in every form, there would have been 200,000 cases of the disease in the total civil population before the war. But more than one-quarter of the

total population has already been accounted for in the groups previously considered, that is, in the civilian prisoners in Germany, the prisoners of war in Germany, the refugees and those who have died from wounds or in battle. These latter we were informed numbered up to February first, 1,300,000. All of the groups thus referred to number 10,000,000 or more than one-fourth of the population of France.

It does not seem likely that the cases of tuberculosis in the civil population have decreased since the war began and an estimate of 150,000 in the 30,000,000 not accounted for would not seem to be excessive. There would, therefore, be altogether probably not far from 500,000 cases of tuberculosis in France to be dealt with if the war were to be terminated at once. An estimate of 400,000 cases would seem to be really conservative.

To deal with these, there are available in France at the present time: First, in the socalled sanitary stations which have been provided since the war began and in the special hospitals and sanatoria for tuberculosis about 11,000 beds. It is hoped before the end of the year to increase this number to 15,000 or 16,000. And, second, there are a few dispensaries, well organized, well equipped and administered, perhaps a dozen in all, and a few more small dispensaries which have done comparatively little work. Third, there are practically no trained nurses or trained social service workers, but there are a few women who have been or are being given three months' courses of training at the present time at the Laennec Hospital. Fourth, there are but few physicians in France who have given any special attention to the tuberculosis problem, hardly more than a dozen, and very few who have had sanatorium experience, and still fewer who are familiar with the tuberculosis work of others. The situation thus is certainly a very serious and threatening one—400,000 cases of disease and practically no facilities for caring for or supervising them.

The French goverment has in part realized the situation and is trying to meet the problem by the establishment of well organized dispensaries in all the populous regions of France, with trained or partially trained social service workers attached to them to visit the cases in their homes. The machinery for the establishment of these dispensaries has been created under a special law, and the cost of the administration has been apportioned under this law on the municipalities, communes, departments and the State. The application of the law, however, is not mandatory. Local initiative is depended upon to es-

tablish these institutions and this will certainly be lacking in many localities which seriously need them.

In Havre, while we were there, although the death rate last year from tuberculosis was 5.5 per 1000, the tuberculosis dispensary, which had been in operation previous to the war, was closed, because there was no physician to operate it and no nurses and workers available. There is urgent need for physicians and nurses, but it is essential that both of these speak French. Dr. Loir, the health officer of Havre, told us that in that city with a population of about 140,000 before the war, there were at the present time only 17 physicians, or one to 8000 of the population. A similar condition exists to a greater or less extent everywhere in France.

The contrast between the present situation with reference to the tuberculosis problem as it exists in England and as it exists in France, is most striking and most instructive. France has suffered from the war infinitely more than England has thus far. Still Great Britain has raised an army of over 5,000,000 men, and no new or serious tuberculosis problem has been created. France, on the other hand, has a problem of such magnitude that it threatens even the future vitality and economic development of the French people. In England the tuberculosis problem had been efficiently met before the war; in France, on the other hand, practically nothing had been done. It is not therefore because measures for the prevention of tuberculosis are wanting or inefficient that tuberculosis has become such a serious problem in so many European countries, but it is simply because the well-tried measures have not been applied, both before and since the outbreak of the war, in an efficient way.

This experience of European countries during the present war indicates that tuberculosis under the conditions of modern warfare is greatly to be dreaded by the military authorities.

It is unnecessary to refer more than to the great ultimate economic loss involved in enrolling men who later develop pulmonary tuberculosis. The expense to the government from the long subsequent care (when the disease develops) and the cost of pensions for the men and their families will be very great, aside from the loss of lives which under ordinary conditions might have been long and productive to the country instead of being a continuous drain on its resources.

Measures adopted to prevent the introduction and development of tuberculosis among our troops as they are mobilizing cannot be too

careful or too stringent. If these measures are efficient and carefully observed in mobilization of the troops and are followed subsequently in their supervision, the United States will be spared the great loss in lives and money and the army the great loss in men and energy that other countries have suffered. Bear in mind that it is not because of the lack of knowledge of preventive measures with reference to tuberculosis but it is because of the lack of application of this knowledge that the losses abroad have occurred.

Recognizing this fact the National Association at the request of the Council of National Defense has appointed a special committee to work with the War and Navy Departments of the Government and with the antituberculosis agencies of the country in devising and executing a war program for the prevention and control of tuberculosis.

In the opinion of this committee the work of the medical corps of the army and navy could be much facilitated and expedited and this corps, already greatly overworked, could be given much needed assistance, if the services of voluntary experts in tuberculosis were employed in various parts of the country in the examination of those recruits for the army who show any signs or symptoms suggestive of pulmonary disease, or in whom the history indicates its possible existence.

The committee has made inquiries and will be able to furnish the War Department a list of a large number of voluntary qualified experts of this character. The committee would recommend that in all of the following cases such an expert in the physical examination of the chest should make an examination before an applicant is enrolled:

1. Every man whose history shows that he has at any previous time had any illness resembling in character pulmonary tuberculosis.

2. Every man who gives a history at any previous time of an attack of pneumonia or pleurisy.

3. Every man whose history shows that one or more members of his immediate family (father, mother, brother, sister, etc.) has had pulmonary tuberculosis, or died of this disease.

4. Every man with a flat chest whose weight as compared with his height is fifteen per cent below the normal.

5. Every man who gives a history of chronic catarrh or who has a cough or any symptoms of any disease in the chest.

6. Every man in whom any abnormal physical signs of any kind are found in the chest.

A careful history of previous illnesses should be taken in the case of every recruit, and preserved. This history should also include the history of his immediate family as to typhoid fever. (In the latter case if the individual has suffered from typhoid fever the Widal test and an examination of the urine and feces for typhoid bacilli should be made.) In any instance in which there is a cough with sputum, the sputum should be examined, and, if negative, it should be reëxamined at least two or three times.

From the experience of those familiar with conditions abroad, and an interpretation of expert opinion in this matter, the committee is of the opinion that any man with even a very limited amount of pulmonary tuberculosis that is latent or arrested, is almost certain to break down under the physical strain of military training and army life and a focus of disease previously latent or arrested will almost certainly become active.

Systematic and complete periodic reëxaminations should be made of all troops within three months after enrollment and at intervals of three months thereafter. These reëxaminations should be as complete and thorough in all respects as the original examinations and should include the taking of the evening temperature of every man who gives a history or the signs of symptoms of being ill-conditioned. Every soldier who has had a cough for a period of two weeks, or any other symptom of pulmonary disease, or whose general physical condition has undergone a serious deterioration, should if necessary be isolated and referred to an expert for reëxamination, and every soldier showing any definite signs or symptoms suggestive of pulmonary disease (when a positive diagnosis is not possible) should be placed under expert observation until a positive diagnosis can be made, or until the existence of pulmonary tuberculosis can be definitely excluded.

Cases in which a positive diagnosis of pulmonary tuberculosis has been made should receive sanatorium or hospital treatment, preferably in institutions located in their home states, since homesickness is likely to counteract the beneficial effects of climate in remote localities. An inventory of available institutions is now being taken.

When the disease is apparently arrested the question of occupation should be determined. It is a matter of common experience that when a tuberculosis subject returns to indoor and factory occupations a relapse is likely to follow, while outdoor employment especially on farms may result in a clinical cure and self-support. The establishment of

government farm colonies is therefore worthy of careful consideration. In discussing the problem in southwestern France, Dr. Leuret wisely remarks, "Left to themselves, they will be apt to drift into crowded factories and sleep in close, crowded rooms, sealing their own doom and infecting others."

The committee deems it unnecessary to consider the subject of camp sanitation, but desires to invite attention to the plans for semi-permanent encampments submitted by Scopes & Feustmann, architects of New York, which appear to possess certain hygienic advantages not offered by canvas shelter. The plans impress the committee as in general suitable, not only for military training camps, but also for prison and concentration camps, and even if slightly modified for the expansion of existing tuberculosis sanatoria.

The committee also recommends that an educational campaign on matters relating to the conservation of the health of our troops be carried on in connection with all military training camps. Every effort which makes for better health and a strong, temperate and virile race, will be an important factor in the prevention of tuberculosis and other communicable diseases.

LESSONS FROM CANADA'S WAR EXPERIENCES WITH TUBERCULOSIS[1]

JABEZ H. ELLIOTT

Toronto, Ontario

In appearing before you this evening, I have come to these United States, a citizen of a foreign nation, yet as one of your neighbors, one of a neighboring peace-loving nation, which for nearly three years has been plunged into a most dreadful war; but I come to this Association, Mr. President, as one of you, as one of the charter members so to speak, my membership dating back to the organization of the Association and my relation to it antedating even its organization, even to the meeting which many of the Executive Board will remember, when the need for such a national society was discussed at the Baltimore Tuberculosis Exhibition, and to that memorable meeting at Atlantic City, when the Association was launched, and when the late Dr. Trudeau, our first president, received an ovation which made the rafters of the church ring for many minutes.

Kipling has said of Canada, "Daughter am I in my mother's house, but mistress in my own." In Canada it is a maxim, "When Britain is at war, Canada is at war," and immediately our prime minister pledged to the mother across the sea our last man and our last dollar. He knew the spirit of Canada, a "spirit born of the deepest emotions of the Canadian people—its love of country, of liberty, and of right." Already, of the male population of Canada, including babes and old men, one in ten have put on the king's uniform, four hundred thousand Canadians, 80 per cent of whom are already overseas. In my own city of Toronto 75,000 men have been recruited. That you may have some conception of what this means, Cincinnati to equal this would also enlist 75,000 men.

In less than a month the government, which asked for 20,000 men, had 40,000 at its disposal. Within two months of the outbreak of war between Great Britain and Germany, the Dominion of Canada concentrated, armed and sent to Europe an expeditionary force of 33,000 men. A voluntary army, the first complete Canadian division ever assembled,

[1] Read at the Thirteenth Annual Meeting of the National Association for the Study and Prevention of Tuberculosis, Cincinnati, Ohio, May 10, 1917.

with more than half of a reserve division, this force was by far the greatest body of soldiers that had ever crossed the Atlantic at one time. It comprised cavalry, artillery, infantry, engineers, signallers, supply and ammunition columns, field ambulances and hospital staffs, provided with all the apparatus for handling and treatment of the wounded; it carried its own complement of rifles, machine guns, field guns and heavy artillery, and a store of ammunition.

The medical organization of this first contingent made serious inroads upon the small permanent staff of the medical corps of our militia, and in the rush born of the necessity of getting trained men to the battle fields of Europe as rapidly as the situation demanded, there was some neglect of the situation developing at home, in the further rapid extension and growth of the Canadian Expeditionary Force and its medical services.

New problems in the medical services, new aspects of old problems, have been constantly arising. Some we have anticipated, others have been met upon arrival, some unfortunately long after they have arisen, and these statements are as true of tuberculosis as of other medical questions we have had to face. Untrained to war, we have had to develop a militia organization until it is upon a war basis.

The title assigned to my paper tonight, "Canada's War Experiences with Tuberculosis," is a subject which I cannot deal with fully, but I shall endeavor to give you some personal impressions which have been crystallizing as the result of eighteen months' experience in examining and classifying for treatment the cases of pulmonary disease returned from overseas to Military District No. 2, and of those cases arising in the camps in the same district, who after observation in the base hospital have been referred to the convalescent hospitals for further treatment.

Canada's lessons from her war experiences have been many, some have been costly. We are not yet through and shall doubtless receive many more lessons, but we are progressing. Men, munitions, money are needed to win this war and these forces must be organized. The ultimate winner will be the one with men. Men are the prime requisite, and when we say men, we mean men medically fit. A man who becomes an invalid is a source of weakness to a fighting unit. We must prevent the enlistment of the potential invalid or of the unfit. Each man found medically unfit *after* enlistment represents a heavy burden upon the country.

First: *He is a non-producer* during the whole time he is removed from civilian life, that is, during the period that he is in service, and during his subsequent period of disability.

Second: *He is a source of expense* while in training and if he should break down in an overseas training camp, each man up to the time of inception of his disability will represent an outlay of several thousand dollars in service pay, allowances, food and shelter and transportation overseas, while no one can estimate the expense of months or years of pensionable disability.

The problem of tuberculosis in the army is, like many others, one of prevention. True, cases will arise, even with the greatest care taken in selection of recruits, and to this association, its members and its affiliated societies, will fall the duty and opportunity of caring for these cases. But dealing with it broadly, we must cut off the supply at its source.

The value of preventive medicine was never better illustrated than in the construction of the Panama Canal, a problem impossible to the greatest engineers until assisted by the sanitary engineers and the expert in the prevention of disease. Typhoid fever well illustrates how disease may be controlled by applying our knowledge of prevention. In the South African War, one out of every nine of the British forces was invalided through this disease. In the Spanish American War, of 107,000 men in Southern camps, who had not left the shores of the United States, 20,000 contracted the disease. It is a disease which especially attacks young adults from seventeen to thirty years of age, and it is endemic in all parts of Canada. Yet we are able to report that in Canada, during 1916, with an average of 116,441 troops, there were but 167 cases of typhoid fever during the year, and no deaths occurred amongst those who had received their three doses of vaccine.

The modern sanitation of camps and the medical care of the troops have worked wonders in the present war. Canada cannot but be gratified when we study the latest compilation from the casualties branch (to January 31, 1917): with 69,729 casualties in the Canadian forces, there were 11,297 killed, 4,136 died from wounds, while from pneumonia, typhoid fever, measles, scarlet fever, tuberculosis, meningitis and all other diseases, there were but 518 deaths.

There can be no doubt that prevention is the note to be sounded in this preparedness campaign against tuberculosis and that no tuberculous or potentially tuberculous citizen be attested. In using the term potentially tuberculous, it may be just as well to state that our modern

conception of the disease tuberculosis as seen in the soldier or any adult, is that it is not a recently acquired disease; that we believe the soldier rarely becomes infected while on active service, but that cases developing under active service conditions, represent an activation of an old and more or less quiescent focus. I know of no better presentation of this phase of the question than the article by Krause in the April number of THE AMERICAN REVIEW OF TUBERCULOSIS, which every tuberculosis worker should read if he wishes to have a clear picture of our present conception of tuberculosis.

We must then eliminate at the preliminary examination all men definitely tuberculous or those who have had a definite pulmonary tuberculosis. If passed as fit, they are to go on to the mobilization center, where they pass a medical board, composed of three members. One of this board should be an officer with special knowledge of diseases of the chest. Where this is not possible, any doubtful cases may be referred to a chest clinic for report, as is done in our district: at first to one of the civil hospital clinics, but in the future all are to be sent to the chest division of one of the military hospitals. No recruit should be attested on the preliminary examination, but only when he has passed the board at the mobilization center and is ready to be drafted to his unit.

After being attached to his unit, he is under the observation of his battalion medical officer, who should watch carefully every man with evidence of "bronchial trouble." Each man should be boarded once in three months as a routine measure, and a most thorough medical examination is essential when he is warned for departure overseas.

Men who do not come up to the standard required for service in a combatant unit, such as the infantry, cavalry, artillery, cycle corps, etc., may yet be fit for one of the non-combatant services, and may be designated for special service in the Army Service Corps, the Army Medical Corps, or more probably may be attached to the home services in clerical or other light duties and relieve a man physically fit for overseas. Some of these who have been drafted to an internment camp or other guard duty have later been accepted for overseas.

In Canada, up to the present, all service is through voluntary enlistment. I may seem, at first glance, to be getting away from my subject in discussing this, but there can be no question that, had we had selective conscription, we would have less tuberculosis in the forces. With selective conscription men of suitable age are brought before a board and

those whose civilian occupations are of such a nature as to be considered essential, are allowed and instructed to continue. Labor and production are not interfered with, and further, the medical examination can be thorough. Calling up various classes, the number of men required can be rapidly secured without serious dislocation of business and with a full assurance that all are medically fit. Under voluntary enlistment there is much competition between the officers commanding various units and pressure is frequently brought to bear upon their medical officer to continue men whose physical condition, to put it mildly, is at least doubtful. Each officer wishes to fill up his battalion as rapidly as possible, hoping to replace any unfit with fit men as opportunity offers. If you will but establish your proposed selective conscription, you will go far to lessen the problem of tuberculosis in the forces.

After enlistment, what? Let us recall that we believe that at least 40 to 50 per cent of adults of military age react to tuberculin. These have received at some time an implantation of tubercle bacilli, which are now more or less walled off and harmless under ordinary conditions, but *may* become active again, and extension of the disease result. Under the strenuous conditions of active service, we must expect a certain number of cases to develop. It cannot be otherwise. Our efforts are to be directed to the control of these conditions which cause a latent tuberculosis to become active.

REINFECTION

Every open case is to be removed at once from active service. All know the dangers of infection and of reinfection. The necessity for removal of a definitely tuberculous case need not be dwelt upon.

FATIGUE

Through lowered resistance to invading microörganisms, fatigue, repeated and continuous, stands in close causal relationship to awakened activity of a tuberculous focus. Fatigue is bound to occur, and if not unduly excessive may be beneficial rather than otherwise. The careful commanding officer and medical officer will see that training in camp is so regulated (as is exercise in a sanatorium) that no ill effects follow. Here again the value of conscription is seen as against voluntary enlistment. Under conscription sufficient men for one battalion are called up within a short time. The men undertake their training together, ad-

vance together and can be classified readily as to the rapidity with which they undertake the heavier work of doubling and route marching with full equipment. Under voluntary enlistment a battalion may take many months to recruit to strength, and thus the first enlisted men may be hard as nails, while the last recruits are soft as butter, so that, unless great care is observed, a great many will break down under training and be invalided out as unfit. Had these men been coached along carefully, a large proportion of them would have stood up.

ACUTE INFECTIONS

Again and again we get this history from our tuberculous cases, "I was never sick in my life, but we had a lot of hard marching," or "I had a severe wetting and got a cold, then became feverish, and I have never been able to shake the cough." *Whatever we do to lessen the acute respiratory infections in camp, we lessen thereby the incidence of tuberculosis.* In our summer camps, when living in tents or in huts accommodating eight to thirty, we find few respiratory catarrhs among the men. In our winter camps, with the men in large barracks, many of which are big, drafty, barn like structures such as warehouses, exposition buildings, etc., we find influenza, measles, "colds," coughs, frequent complaints. An outbreak of measles in a military hospital or camp has been followed, in our experience, by an increased number of cases of tuberculosis. It is advisable therefore to house the men in tents of eight, or in huts of not more than twenty or thirty beds, so that epidemic diseases may be controlled by the quarantine of a smaller number of men.

SANITATION

Sanitation in general bears indirectly upon the incidence of tuberculosis and must be mentioned in a complete scheme for lessening this disease. The water supply, latrines, sewage disposal, garbage collection and facilities for bathing are all of the utmost importance.

PHYSICAL EXAMINATION

Routine examination of the men at stated intervals will be one of the most important measures, particularly with reference to the observation of those who have cough, debility, loss of weight or who tire unduly. Finding these cases early devolves upon the medical officer of the unit, but should be checked up by the inspections of the regular medical boards.

LIQUOR CONTROL

More or less directly connected with the tuberculosis problem is that of liquor. We know that the use of spirituous and malt liquors does increase the incidence of tuberculosis, both through its effect upon the individual and its indirect effect upon the family.

In the past twenty months of the war, England spent £3,000,000,000 upon liquor, a business which employed 500,000 workers, who might have been producers in other lines, a business which required 1,000,000 acres of land and used 1,500,000 tons of coal a year, in a time when hospital ships are forced to steam slowly with coal of a poor quality, because the best coal is required by the navy, and this enormous quantity is required by the liquor business. Similar figures hold true for the United States.

Is it right that every man should face the increasing price of the loaf of bread from five cents, now up to ten, twelve, fifteen cents in price, because another man is not willing to forego his beer or whiskey? A short time ago, Sir Robert Borden stood before an English audience and argued strongly in favor of the national conservation of all our resources. He said, "Waste in time of peace is a sin, in this time of national stress and danger it is a crime. I speak of waste in the broadest sense—waste of food, waste of time, waste of opportunity, waste of labor." The whole world faces a food shortage, and the destruction of grain and sugar in brewing and distilling cannot be accounted other than a crime. When we know that food shortage and the use of alcohol are great factors in the increased incidence of tuberculosis, this association must take cognizance of this enormous destruction of foodstuffs and exert its influence to aid the efforts of those who would do away with this enormous economic waste.

THE ORGANIZATION OF THE MEDICAL SERVICES

General organization I shall not endeavor to discuss. A large number of medical officers will be required. We have now 1800 medical men in overseas service. This does not include those who are attached to the convalescent hospitals in Canada. For you to come in on a similar scale will require 20,000 for overseas. Some of the most important special work is that of the orthopedic surgeon, the general surgeon, the neurologist, the psychiatrist, the internist with special knowledge of

the heart and circulatory conditions, and the internist with special knowledge of pulmonary diseases.

The sanatorium physician should not leave his post: the civilian population must be cared for in war as in peace, and he will be needed to care for military patients. We have no sanatorium physicians who can be spared, and the differential diagnosis of chest conditions should be in the hands of the clinician attached to a chest clinic rather than to the man who has worked only in a sanatorium or hospital for tuberculosis. I quote from a report on the Canadian Medical Services, which may help you to avoid some of our earlier mistakes:

> It is notable that the average income of medical men is small and generally little beyond their actual requirements, and it is a fact that many of them have obligations or have to meet circumstances which will not permit of their entering the Canadian Army Medical Service at the present rates of pay. Their only asset is time and ability in their professional work and this cannot be delegated to anyone else to carry on.
>
> It takes at least five years to make a medical officer, and even at that the required material can only be drawn from the ranks of university matriculants. The knowledge and experience gained by them is brought into the service at their own and not the public expense. Such is not the case in most other branches of the service.
>
> The supply of medical officers available for service is therefore limited and must not be drawn upon too generously. Particular care should be taken to see that every officer taken into the service has some tangible duty to perform. Allowance must of course be made for an adequate working surplus.
>
> Bringing, as they do, their professional knowledge into the service, and entering to serve in their professional capacity it would seem reasonable that some better terms of service than are at present in effect should be granted to them.
>
> Medical men available for service might be classified as: (1) Recent graduates. (2) Practitioners of five to ten years experience and junior specialists, of an average age up to thirty-five. (3) Practitioners of ten to twenty years experience and advanced specialists, of an average age up to forty-five. (4) Senior specialists. It is obvious, making allowance for exceptional cases, that these various classes cannot possibly bring into the service the same amount of experience, professional ability and usefulness, nor have they equal obligations in civilian life; and so it would seem unfair and unwise to impose upon the senior specialist or practitioners of much valuable experience the same conditions of enlistment and service as upon the recent graduate or practitioner of little experience.

The present reinforcement plan as administered in the Canadian Army Medical Corps, with but few exceptions, imposes upon all classes the same conditions. They are all required to join the Army Medical Corps training depots with the same rank (captain) and wait until they are drafted over, without any idea as to the length of time that may elapse before this event or how they may be employed upon arrival overseas. Surgical or medical specialists may be given office work to perform, laboratory men may suddenly be transformed into surgeons and the university professor may find himself in a position in which his duties are prescribed by one of his recent students who arrived overseas ahead of him. Such absurd situations have been reported though at present it is understood that attempts are being made to fit medical officers into positions for which they are most suited. At the same time it has been impossible to assure men of high standing who might offer their services that such absurdities will not be repeated.

Such conditions of enlistment and service deter valuable experienced men from offering their services.

The careful survey of the medical profession which you are making will avoid the mistakes we fell into in our rapid mobilization, and will allow you to make most efficient this important arm of the service, an efficiency we are now striving for.

CASUALTIES

I shall only touch upon the details of procedure in dealing with casualties. When a man "goes sick" in a training camp, he is admitted to the camp hospital, and if his illness is more than temporary, he is evacuated to the base hospital. Should he be found tuberculous, he is transferred to a sanatorium at once. If doubtful, he is kept under observation as long as febrile or ill. When convalescent, if a diagnosis is not yet arrived at, he is transferred as a casualty to one of the convalescent hospitals for further observation and diagnosis.

A casualty in an English training camp is similarly dealt with. If in France, he is passed back from the Regimental Aid Post, to the Field Ambulance, thence to the Casualty Clearing Station, to the Stationary or General Hospital, and to the Convalescent Depot for transfer to England. Here he enters the Primary Hospital where, after his history is written and examination made, he is passed on; if tuberculous, to a sanatorium for treatment. As soon as his disease is quiescent, he is transferred to a convalescent hospital if a closed case (e.g., pleural tuberculosis), and there, or at the sanatorium, awaits his medical board,

when he is passed on to the Canadian Casualty Assembly Centre to await transportation to Canada.

Two classes of tuberculous are returned to Canada: those quite convalescent, and those hopelessly ill for whom further treatment in England gives no promise of arrest of the disease.

Arriving in Canada, a medical board examines him at the point of debarkation, and with his English papers and regimental record before them, his disability is estimated both as to nature and as to time required for treatment. He is then sent on to the military district from which he enlisted.

At Spadina Military Hospital, which is the clearing hospital for Military District No. 2, I see all the pulmonary cases returning to the Toronto district. These include the gunshot wounds of the chest, emphysema, asthma, bronchitis, convalescent pleurisies and empyemas, tuberculosis and the tuberculosis suspect.

On May 1, 1917, last, we had 618 tuberculous patients under treatment in Canada in 18 sanatoriums. Five sanatoriums are exclusively for soldiers. In others they are cared for with the civilian patients. One at Kingston, Ontario, which had 32 beds, has been added to by the Military Hospitals Commission and will have immediately 175 beds. At the Mountain Sanatorium, Hamilton, Ontario, which had 125 beds and had 125 acres of ground, the Commission has on another part of the farm, three-quarters of a mile away, made accommodation for 175 soldiers by using a new administration building recently built, and by erecting five pavilions. This will be extended at once to 275 beds. The soldiers are under the care of the sanatorium physician with separate military administration. A similar arrangement has been made with the London Health Association at London, Ontario, where the Commission is erecting its own buildings for 110 men.

The Canadian Association for the Prevention of Tuberculosis, at its meeting in Quebec last September, recommended that soldiers be cared for, as far as possible, in their own military district; that use be made of existing institutions as far as possible, making such additions, though temporary, as might be necessary or feasible, and that in addition there be established a central federal military sanatorium of at least 300 to 500 beds; that it be supplied with facilities for vocational training, and that it be a farm sanatorium as well where a colony for suitable cases might be developed. So far, existing institutions with additions such as mentioned give us at present the number of beds we require. The

federal sanatorium is not yet under way, but our Hospitals Commission is awake to the tuberculosis situation and is prepared to provide all accommodation necessary for the cases arising in our forces. We are adding vocational workshops to our sanatorium equipment, all of which are under the general direction of a vocational officer assigned to organize this work in all the convalescent hospitals of the Dominion.

The cost of additions made to sanatoriums is borne by the Military Hospitals Commission, or in some cases, equally by the Commission and the province in which they are situated.

The daily maintenance per patient is estimated and is covered by a weekly allowance to each sanatorium based on the per capita cost.

Just at this point I would like to mention the desirability of an institution or institutions for the care of non-tuberculous pulmonary cases, asthma, bronchitis, emphysema and bronchitis, convalescent pleurisies and empyemas with collapsed lungs, and gunshot wounds of the chest which have been followed by haemothorax or empyema, with resultant collapse of the lung. Many of these require special care, and the latter have improved remarkably under suitable pulmonary exercises.

For the cases of asthma and chronic bronchitis, I am hopeful we shall have a convalescent hospital in the far west, where we know, in our civilian practice, our patients receive notable relief.

In the work of examining we find a fairly large number coming home as medically unfit with some of a group of symptoms, including debility, loss of weight, tachycardia, perhaps tremor, cough, poor expansion, who have been classified as tuberculous suspects (some other disability may also have been diagnosed). These are a most interesting lot of cases for study. We find among them hyperthyroidism, debility with chronic bronchitis, bronchitis with shell shock, excessive use of tobacco. There is another group whose physical signs and X-ray plates demonstrate old lesions which are perfectly quiescent but who have a non-tuberculous bronchitis and no evidence of active tuberculosis. We find, too, a group with emphysema and winter bronchitis, who show definite old apical changes, but who have come through strenuous months in France, with its rain and wind, without any reactivity of the tuberculosis.

Capt. J. Roddick Byers, a member of this association, who is in charge of 120 military beds at St. Agathe, Quebec, has given us some interesting figures from his experiences with the men:

Two hundred and twelve cases admitted were classified as follows:

		Days stay	
Incipient	42	1–30 days	57
Moderately advanced	137	30–60 days	37
Advanced	31	60–90 days	35
Non-tuberculous	2	90 days and over	83
	212		212

As to reason for discharge, the figures are interesting and indicate some of the difficulties which must be met:

Patients who left by signing a release	85
Discharged for bad conduct and crime	35
Transfers	36
Completed treatment	56
	212

One great difficulty we have to face is indicated in Dr. Byers's table; that men wish to leave before completing treatment. They have become gregarious and, having been living under great excitement, many are not content with sanatorium life. They long for the cities and the bustle of crowds and the entertainment they can get; and this is a disturbing element in treatment.

Could we keep the men under treatment a sufficient length of time, I am satisfied we could get excellent results, for the condition as a rule is discovered soon after symptoms set in and treatment is instituted much earlier than in civil life. Then, too, most of them have a good constitution and all have been living in the open air. When in civil life many patients do not give up until they are unable to stand up. In the army, a man "goes sick" when he is unable to carry a heavy rifle and 30 pound pack on an eight mile route march or when he goes back into relief.

That you may have some conception of the preparation to be made, I can present you the following figures:

During the ten months from January 1, to October 31, 1916, we had on an average 116,441 troops in Canada, in training or awaiting embarkation. From these there were admitted to the hospital during the ten months 492 cases of pulmonary tuberculosis.

From our Canadian forces overseas, we have already had 670 invalided home with tuberculosis, to March 31, 1917.

On May 1, of this year, there were 618 being cared for in sanatoriums throughout Canada.

About 40 per cent of those transferred to sanatoriums for treatment ask for release before the time the medical officer considers them fit for return to civilian life, but suitable occupational work is lessening this.

About 10 per cent of sanatorium patients have asked for discharge within thirty days of admission.

We may expect good results from treatment. In February, 1917, a census was taken of 604 men in sanatoriums,

	Per cent.
Incipient cases	16
Prognosis: Good in	58
Doubtful in	11
Bad in	10
Incurable	6

Of these 604 men, 176 has been in France, 162 to England only, and the balance presumably had not been out of Canada.

The work of our civil sanatoriums is being carried on as in peace and I have been assured by a number of our charities that their income from voluntary subscription has not been materially affected by the war.

There should be no slackening of our efforts to meet the civilian tuberculosis problem simply because the military problem is before us.

Speaking generally of our casualties, we need thorough organization and the keenest scientific care in dealing with the man coming back disabled. By neglecting to restore every man to the highest efficiency he is able to maintain, we should be adding to the country's burden in two ways; first, by the greater pension to which he will be entitled and which will form a burden for later generations, and secondly, the heavier burden laid on the country by the loss of these men's industry.

The tuberculous soldier, inefficiently or incompletely treated, is a further burden in that he may be a focus for further spread of the disease.

The man who has sacrificed his health in the cause of humanity, of liberty, and of right, demands all that advanced science and a grateful nation can give him, no matter how much it may cost our country in gold, or ourselves and other citizens in personal sacrifice.

PROGNOSIS IN TUBERCULOSIS FROM THE STANDPOINT OF THE OCCURRENCE OF HEMOPTYSIS AND TUBERCLE BACILLI IN THE SPUTUM

FRED H. HEISE

From the Trudeau Sanatorium, Trudeau, New York

Almost every one recognizes at this time the belief that there is a distinct advantage to the patient as regards prognosis when tubercle bacilli are not found in the sputum, or in other words when the lesion is not an open one. Likewise most of us believe that the occurrence of hemoptysis is quite likely to be associated with a poorer prognosis than when hemoptysis does not occur. To just what extent these beliefs are substantiated by statistical evidence may still be quite undetermined among some of us. And it is for the purpose of recalling these beliefs to your mind and further elucidating them that the present statistical observations are made.

How could the occurrence of hemoptysis or of tubercle bacilli in the sputum affect the prognosis of the disease in any case? We all know that hemoptysis is fairly often followed by the aspiration of infected blood, leading to broncho-pneumonic conditions within the lung, in regions previously infected or uninfected. This condition gives rise in many instances to an acute progression of the disease. So too when tubercle bacilli occur in the sputum, new areas may be infected by aspiration or by back pressure during cough. The lesion then is a more dangerous one, although unaccompanied by symptoms of activity. At the same time, while tubercle bacilli do occur in the sputum the chances of complete inactivity at the focus are less than if they did not occur. So that, with the occurrence of hemoptysis or of tubercle bacilli in the sputum, we might expect a greater frequency of relapse, a more rapid progression of the disease, and a larger percentage of deaths due to tuberculosis, since the patients do not live long enough to die of other causes.

Elderton and Perry (1), in their very exhaustive statistical study of pulmonary tuberculosis, made very largely from records of the Adirondack Cottage Sanitarium furnished by Dr. Lawrason Brown, say that pa-

tients who have had hemoptysis have a slightly heavier mortality than those who have not, the ratio being 1½ to 1, and that those in whose sputum tubercle bacilli were found have more than twice the mortality of those in whose sputum no tubercle bacilli were found. They also state that the mortality of those patients in whose sputum no tubercle bacilli were found is considerably greater than the expected mortality according to the English Life Table No. 6. A marked difference is also seen in their tables of the mortality of those cases in whose sputum tubercle bacilli were found between the incipient and moderately advanced cases. In the former the mortality is 4½ times and in the latter nearly 12 times the expected. The marked difference in actual mortality as related to the expected mortality occurring in the incipient and moderately advanced, the apparently cured or arrested and the quiescent cases has also been shown by Lawrason Brown (2), King (3), and others. N. D. Bardswell (4), in a statistical study of cases discharged from the sanatorium for from approximately one to five years, has also definitely shown the greater unfavorable prognosis in the positive sputum cases. In his series there were 764 cases with positive sputum and 156 with negative sputum. The percentages of living and dead in the incipient, moderately advanced and far advanced cases in the positive sputum group were as follows:

Incipient	alive 83.6 per cent, dead 16.3 per cent
Moderately advanced	alive 61.6 per cent, dead 38.3 per cent
Far advanced	alive 28.5 per cent, dead 71.4 per cent

whereas, of all the negative sputum cases 89.1 per cent were alive and 10.9 per cent dead. Thus a distinct advantage as to prognosis was shown in the bacilli free cases. It was thus also shown that in the positive sputum group the more advanced the disease the more unfavorable the prognosis. Of the 764 cases with tubercle bacilli in the sputum in Bardswell's series, 158 or 20 per cent lost their bacilli before discharge from the sanatorium. These cases showed a much better prognosis than those who did not lose their bacilli, as is seen from the following figures: Of the 158 who lost their bacilli 84.1 per cent were alive and 15.8 per cent dead, whereas of the 606 who did not lose their bacilli 50.1 per cent were alive and 49.8 per cent dead.

King (3), in an analysis of 1515 cases, showed that there is a distinct advantage in the expectancy of life to both the bacilli free cases and the bacilli positive cases who lose their bacilli, as compared to the bacilli

positive cases who do not lose their bacilli while at the sanatorium. His observations extend over a period of five years after discharge from the sanatorium, and show the odds for or against life at the end of five years to be 6.9 to 1 in favor of life in the bacilli free cases, 3.4 to 1 in favor of life in the cases who lost their bacilli during their stay at the sanatorium, and 2.5 to 1 against life in those who did not lose their bacilli at the sanatorium. He also shows a distinct advantage in expectancy of life the earlier the cases were diagnosed and especially so the better the condition at discharge.

From the foregoing statistics it is very evident then that the occurrence of tubercle bacilli in the sputum denotes a much less favorable prognosis than if there were no tubercle bacilli demonstrable. They also show that when tubercle bacilli do occur in the sputum, a much more favorable prognosis is warranted if the bacilli disappear. Of course the bad prognosis in the positive sputum cases is in part due to the higher percentage of advanced cases in this group, but group for group the prognosis is better when the tubercle bacilli are never found or disappear.

The occurrence of hemoptysis also, according to Elderton and Perry (1), denotes a less favorable prognosis than if hemoptysis does not occur.

As all of you know who have attempted statistical application in pulmonary tuberculosis, there are many factors of influence which cannot be tabulated because of insufficient means of obtaining the proper knowledge applicable to the degree of influence of the same factor in each individual case. Particularly is this so since the course of the disease has so many different modifications from time to time, as shown in relapses and apparent recoveries, and further too in that the disease is generally of such long duration that accurate and controlled observation cannot easily be made in a large series of cases, inasmuch as the patients leave our care for periods of various duration. So, when one considers all of the possible factors which may influence let us say the prognosis of the disease, it is readily seen how hopeless will be the absolute determination of prognosis in any given case. However, there are group tendencies which can be relatively determined and which as a general working rule will give valuable knowledge as to prognosis and therefore perhaps also as to treatment.

The group tendencies studied in this report, as mentioned above, relate to the occurrence of tubercle bacilli in the sputum and hemoptysis toward the prognosis in its ultimate sense. Thus we have taken under

consideration four separate groups and have compared in each group the condition of the patient, "alive" or "dead," the approximate time of death after leaving the sanatorium, and the cause of death. The four groups in which the comparisons were made are as follows:

1. Those who gave no history of hemoptysis at any time and in whose sputum tubercle bacilli were never found, previous to their discharge from the sanatorium.

2. Those who gave a history of hemoptysis but in whose sputum tubercle bacilli were never found previous to their discharge from the sanatorium.

3. Those whose sputum at some time contained tubercle bacilli, but who never had hemoptysis previous to their discharge from the sanatorium.

4. Those who gave a history of hemoptysis and in whose sputum tubercle bacilli were found.

Each of these groups was subdivided into three classes according to the diagnosis of the lesion made upon admission to the sanatorium, namely, incipient, moderately advanced and far advanced. This was done to obtain a more accurate comparison of the component parts of each group and to determine if possible any fallacy which might occur as the result of difference in diagnosis.

The progress while in the sanatorium and the discharge conditions were not reckoned with, although quite possibly much additional information and more accurate knowledge could be obtained.

Of course there will be criticism of any basis used for the purpose of comparison, as also will there be criticism of any manner of grouping for analysis. However, as has been said many times before, "alive" and "dead" are two absolutely determinable factors. The cause of death may in some instances be questioned, although death from pulmonary tuberculosis is quite readily determinable since it is not apt to be mistaken in one previously treated for tuberculosis. The time of death is in nearly all cases a readily obtainable fact. Not so free from criticism are the respective group formations with the exception perhaps of those who have had tubercle bacilli in their sputum. And yet, since the occurrence of bacilli in the sputum at any time in the history of the patient until his discharge from the sanatorium is considered as placing him in the positive sputum group, there are questions which may arise as to the accuracy of the positive findings and hence the diagnosis in some cases. As to the group giving a history of hemoptysis, we feel that this is from the standpoint of diagnosis a rather certain group,

since the determinations of Lord and others show a great frequency of tuberculosis associated with the occurrence of hemoptysis. The one group which is most open to question from the standpoint of diagnosis is that in which neither hemoptysis occurred nor bacilli were found at any time. Yet all of these cases were diagnosed by competent men as being tuberculous. In the light of our present knowledge a fair percentage probably were not tuberculous. And this same criticism will apply also to the incipient class in the subdivisions. However, there is at present no absolute method for the determination of some points in diagnosis and classification, so that the groups and their subdivisions must represent the best we can now do. So too the incipient cases, by reason of their shorter history of duration, would be less likely to have had hemoptysis or bacilli than the moderately advanced and far advanced cases.

Altogether there were 1400 cases in the series studied, in all of which the condition whether "alive" or "dead" was accurately known. Of the total number the cause of death was definitely known in 620 cases. From these known cases the percentages of the causes of death were calculated. Of the total 1400 cases, 723 or 52 per cent were alive, and 677 or 48 per cent dead. Of the 620 deaths of known cause, tuberculosis was the cause in 552 or 89 per cent. There were only 68 or 11 per cent of the 620 cases dying from other causes than tuberculosis. In order to eliminate as far as possible errors due to difference in treatment while at the sanatorium and other factors, the total number of cases was subdivided into three distinct groups of approximately the same number of cases. The results of the study of all cases are shown in the following table 1 and its three subdivisions, A, B and C.

From these tables it is readily seen that the percentage of living diminishes as we proceed from group I to group IV, and that the percentages of those dying from causes other than tuberculosis are higher in the first two groups. There is also seen a close relation between groups I and II, and between groups III and IV. In other words, when the patient has had neither hemoptysis nor bacilli in the sputum his chances of living are best. When hemoptysis has occurred but no tubercle bacilli have been demonstrated his chances of living are somewhat less. When tubercle bacilli are found in the sputum, however, the prognosis as to life is much poorer than if they had not been found. And the poorest prognosis occurs in those who have had hemoptysis and in whose sputum tubercle bacilli were found.

TABLE 1

Percentages of "living and dead" and of deaths due to tuberculosis and other causes

1400 Cases, 10 to 19 years after discharge

	GROUP I		GROUP II		GROUP III		GROUP IV	
	No Hemoptysis No Bacilli		Hemoptysis No Bacilli		Bacilli No Hemoptysis		Bacilli Hemoptysis	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Totals	276		126		540		458	
Alive	223	81	95	75	201	63	204	55
Dead	53	19	31	25	339	37	254	45
Deaths, cause known	50		24		304		242	
Died of tuberculosis	30	60	12	50	280	92	230	95
Died of other causes	20	40	12	50	24	8	12	5

Series A

460 Cases, 16 to 19 years after discharge

Totals	72		32		200		156	
Alive	50	69	19	63	40	20	55	35
Dead	22	31	13	37	160	80	101	65
Deaths, cause known	22		9		135		95	
Died of tuberculosis	12	55	4	45	125	93	91	96
Died of other causes	10	45	5	55	10	7	4	4

Series B

475 Cases, 13 to 16 years after discharge

Totals	95		53		163		164	
Alive	78	82	44	83	60	37	64	41
Dead	17	18	9	17	103	63	96	59
Deaths, cause known	17		8		97		93	
Died of tuberculosis	11	65	6	75	90	93	89	96
Died of other causes	6	35	2	25	7	7	4	4

Series C

465 Cases, 10 to 13 years after discharge

Totals	109		41		177		138	
Alive	95	87	32	78	101	57	81	59
Dead	14	13	9	22	76	43	57	41
Deaths, cause known	11		7		72		54	
Died of tuberculosis	7	57	2	29	65	90	50	93
Died of other causes	4	43	5	71	7	10	4	7

So also the chances of dying from tuberculosis increase as hemoptysis, bacilli, or both occur. Prognosis becomes poorer and death from tuberculosis more likely as we proceed from group I to group IV, and the presence of tubercle bacilli in the sputum is the principal deciding factor.

The higher percentages of the living in series B and C over A are due to the fact that in the cases in series B and C there are shorter periods of observation since their discharge from the sanatorium, and a sufficient time has not elapsed for more deaths to occur.

When we divide the cases occurring in the different groups into incipient and moderately advanced (the far advanced cases not being considered as there were none in groups I and II) we find that the percentage of living becomes less as we go from group I to group IV, and that groups I and II, and groups III and IV bear a close relation to each other. This applies also to the incipient group, and likewise to the moderately advanced group with the exception of group IV which shows a higher percentage living than group III. Why this should be is hard to say. Perhaps the occurrence of hemoptysis may have been followed by better self care. In all respects then the group tendencies are marked in both incipient and moderately advanced cases. The percentages of "living" however are considerably higher in the incipient cases. These facts are shown in the following table 2:

TABLE 2

Showing the group tendencies in incipient and moderately advanced cases

	GROUP I: No Hemoptysis No Bacilli		GROUP II: Hemoptysis No Bacilli		GROUP III: Bacilli No Hemoptysis		GROUP IV: Hemoptysis Bacilli					
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent			Number	Per cent
Number of cases....	205		95		125		95		Incipient		520	
Alive.....	173	84	77	81	82	66	64	67		Alive....	396	76
Dead.....	32	16	18	19	43	34	31	33		Dead....	124	24
Number of cases...	72		31		377		342		Moderately advanced		822	
Alive.....	50	69	19	61	119	32	143	42		Alive....	331	40
Dead.....	22	31	12	39	258	68	199	58		Dead....	491	60

Table 3 shows the total number of incipient and moderately advanced cases in each group and the percentages of each group dying in each year after discharge. From this we see that the highest mortality of any two years occurs in the first two years after discharge. At first there is a striking difference in the group tendencies, the greater proportion of cases dying in groups III and IV. After the fifth year however there seems to be an equalizing process going on, so that by the end of the tenth year the percentage of each group dying each year is approximately the same.

TABLE 3

Percentage of cases in each group dying in each year

YEARS AFTER DISCHARGE	GROUP I		GROUP II		GROUP III		GROUP IV	
	No Hemoptysis No Bacilli		Hemoptysis No Bacilli		Bacilli No Hemoptysis		Bacilli Hemoptysis	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Number of cases.....	277		126		502		437	
1	6	2.0	3	2.4	38	7.6	59	13.5
2	10	3.6	3	2.4	46	9.2	44	10.0
3	6	2.0	4	3.1	38	7.6	28	6.4
4	2	0.7	2	1.6	24	4.8	27	6.2
5	1	0.3	4	3.1	32	6.4	18	4.1
6	3	1.0	1	0.8	21	4.2	7	1.6
7	3	1.0	2	1.6	16	3.2	12	2.8
8	6	2.0	0	0	19	3.8	5	1.1
9	2	0.7	2	1.0	20	4.0	6	1.4
10	3	1.0	0	0	10	2.0	5	1.1
11	3	1.0	1	0.8	6	1.2	7	1.6
12	1	0.3	1	0.8	8	1.6	2	0.4
13	1	0.3	1	0.8	3	0.6	2	0.4
14	3	1.0	2	1.6	2	0.4	4	0.9
15	2	0.7	1	0.8	3	0.6	1	0.2
16	0	0	0	0	1	0.2	0	0
17	0	0	0	0	0	0	1	0.2
Deaths.....	52	17.6	27	21.4	287	57.4	228	51.9

From the study of these cases we may say in conclusion that there are group tendencies in the incipient and moderately advanced cases which influence prognosis, both as to time and cause of death. These are, for a period of one to nineteen years after discharge, as follows:

Group I. When hemoptysis has not occurred and tubercle bacilli have not been found in the sputum, the prognosis is best (alive 82.4 per cent, dead 17.6 per cent).

Group II. When hemoptysis has occurred but tubercle bacilli are never found, the prognosis becomes less favorable than in group I (alive 78.6 per cent, dead 21.4 per cent.)

Group III. When bacilli are found in the sputum and hemoptysis has not occurred, the prognosis is decidedly more unfavorable than in group I (alive 42.6 per cent, dead 57.4 per cent).

Group IV. When hemoptysis has occurred and bacilli were found, the prognosis, strange to relate, is for the first five years more unfavorable and in the subsequent five years somewhat more favorable than in group III. The percentages are: First five years: group III, alive 71.4 per cent, dead 28.6 per cent; group IV, alive 59.8 per cent, dead 40.2 per cent; fifth to tenth years: group III, alive 81.8 per cent, dead 17.2 per cent; group IV, alive 92 per cent, dead 8 per cent. After the tenth year the prognosis seems to be approximately the same for all groups.

REFERENCES

(1) EDERTON, PALIN W. AND PERRY, SIDNEY J.: A fourth study of the statistics of pulmonary tuberculosis: the mortality of the tuberculous: sanatorium and tuberculin treatment. Drapers' Company Research Memoirs, 1913.

(2) BROWN, LAWRASON: The ultimate results of sanatorium treatment. Trans. Sixth Internat. Cong. Tuber., 1908.

(3) KING, HERBERT M.: Contribution to the study of prognosis in tuberculosis. Bull. Johns Hopkins Hosp., 1915, xxvi, 322.

(4) BARDSWELL, NOEL D.: The treatment of pulmonary tuberculosis. Lancet, 1913, i, 679.

A STUDY OF THE SIGNS AND SYMPTOMS OF AUTONOMIC DISTURBANCE OCCURRING IN PULMONARY TUBERCULOSIS[1]

MYER SOLIS-COHEN

Philadelphia, Pennsylvania

The various manifestations of autonomic disturbance occurring in cases of pulmonary tuberculosis have received little attention, although they are present, to a greater or less degree, in nearly every patient. Indeed, they frequently are more prominent than the symptoms referable to the lungs and, especially in latent and arrested cases, may be the only phenomena noticed by the patient or by his physician. On the other hand, unless inquired for, they may be very easily overlooked.

For a number of years I have noted evidences of autonomic disturbance in many patients suffering from pulmonary tuberculosis, and, conversely, have frequently discovered tuberculous lesions in the lungs of patients who had presented phenomena of autonomic ataxia.

Several years ago, while mentioning this coincidence to Dr. Solomon Solis-Cohen, who confirmed its occurrence, I was asked by him to make an investigation in regard to it, but the scheme suggested was so elaborate that I never had the time to undertake it myself; nor could I sufficiently interest and enthuse the resident physicians at the sanatoria I attend to get them to carry it out.

For several years, however, in examining patients with pulmonary tuberculosis, when time permitted, I have been directing my attention to a number of the principal signs and symptoms of autonomic disturbance, noting their presence or absence. This paper presents an analysis of such patients and of those of my tuberculous patients in whom I had previously noted evidence of autonomic disturbance. In few of the latter did I inquire for autonomic symptoms, merely recording those that forced themselves upon my attention; nor did I note the absence of such symptoms.

One hundred and nineteen patients form the basis for this study, of whom 41 were male and 78 female. Nineteen were ten years old or

[1] Read before the College of Physicians of Philadelphia, February 2, 1916.

younger, 18 were between the ages of eleven and twenty, 45 between twenty-one and thirty years, 14 between thirty-one and forty years, 9 between forty-one and fifty years, 3 between fifty-one and sixty years, and 2 between sixty-one and seventy years. The age was not recorded in 9 cases. Ninety-four were in the first or incipient stage of the disease, according to the schema of the National Association for the Study and Prevention of Tuberculosis, 13 were in the second or moderately advanced stage, and 12 were in the third or far-advanced stage. Ninety-four were in class 1 of Turban's classification, 16 in class 2 and 9 in class 3. Forty were what I term latent cases, presenting no symptoms referable to the lungs, 12 were arrested cases, 32 were improving, 24 stationary, and 12 advancing cases. Forty-eight gave a history of tuberculosis in the family and 21 gave a history of no tuberculosis in the family, the other histories not being sufficiently definite to warrant their inclusion. Eleven gave a definite history of vasomotor disturbances in the family, while in most of the cases no inquiry was made as to any such condition.

Thirteen of the patients were under my care at the Home for Consumptives at Chestnut Hill, 27 were under my care at the Eagleville Sanatorium for Consumptives, and 79 were patients in my private practice or seen in consultation. The symptoms of autonomic disturbance particularly inquired for were flushing, burning of one side of the face or of one part of the body, subjective sensations of heat and cold, sweating (exclusive of night sweats), bleeding, angioneurotic edema, urticaria, asthma, hay fever, and migraine. Note was made, of course, of any other vasomotor symptoms complained of. The signs indicative of vasomotor disturbance looked for on physical examination were pallor, clearness of skin or the reverse, dermographism, the production of a black line by drawing silver across the face (which must be free from powder), exposure of sclera above or below the cornea in repose, and on voluntarily widening the commissure, and on fixing the eyes, or an increased exposure of sclera under the last two conditions, involuntary elevation of the eyebrows on voluntarily widening the commissure, and the division of the finger nail into three striations of reddish distally, whitish in the middle and bluish proximally. The size of the thyroid gland was also observed, being recorded as palpable or non-palpable, or as enlarged slightly, moderately, or markedly.

Unfortunately, every patient was not examined for each sign and symptom. Few children, for instance, were considered reliable enough

to be questioned for subjective symptoms. Frequently time did not permit a full investigation. I often forgot to look for or to record the presence or especially the absence of one or more of the signs and symptoms. The earlier histories contain no systematic investigation and no negative records, but merely note the presence of symptoms complained of by the patient and of signs brought to the attention of the examiner. In calculating the percentage of patients exhibiting a certain phenomenon, therefore, I have included only those patients who are recorded as showing or not showing it, leaving out those whose histories are silent in regard to it. This probably makes the percentages somewhat higher than they actually are; for it is more likely that a sign or symptom is absent when no mention is made of it than that it was overlooked. On the other hand the symptoms studied are of such a character that a patient coming to a physician for a cough or for nervousness would not be apt to relate them, even when present, and the signs are not those that would be noticed by a physician not on the lookout for them. I have not regarded seriously any percentage based on less than 5 cases, which I have indicated by parentheses. Inasmuch as in only a very few cases was mention made of the absence of pallor, of involuntary elevation of the eybrows on voluntarily widening the commissure, or of vasomotor symptoms other than those mentioned, no attempt has been made to calculate their percentages, the number occurring merely being stated.

With this exception the following tables give the number of cases specifically examined for each sign or symptom and the number of cases in which it was observed, with the percentage of patients showing it. The patients are then divided according to sex, age, stage of the disease, amount of lung involvement (Turban's classification), progress of the disease, a positive or negative family history of tuberculosis and a positive family history of vasomotor disturbance.

In the order of their frequency the autonomic pnenomena most commonly observed in patients with pulmonary tuberculosis are dermographism (87 per cent), clear skin (85 per cent), tricolored nails (64 per cent), exposure of sclera or of increased amount of sclera above or below the cornea on voluntarily widening the commissure (50 per cent), flushing (49 per cent), exposure of sclera normally above or below the cornea (48 per cent), sweating, exclusive of night sweats, (45 per cent), migraine (43 per cent), black line with silver (40 per cent), urticaria (38 per cent), palpable thyroid gland (36 per cent), subjective sensations of cold (27

Flushing

	NUMBER OF CASES	PRESENT IN	PER CENT
Total	73	36	49
Male	24	7	29
Female	49	29	59
10 years and less	5	5	100
11 to 20 years	11	5	45
21 to 30 years	32	14	44
31 to 40 years	10	5	50
41 to 50 years	2	1	(50)
51 to 60 years	3	0	(0)
61 to 70 years	2	1	(50)
Stage I	55	30	55
Stage II	9	3	33
Stage III	9	3	33
Class 1	57	31	54
Class 2	11	4	36
Class 3	5	1	20
Latent	27	14	52
Arrested	8	3	37
Improving	14	8	57
Stationary	16	6	37
Advancing	8	5	62
Family history of tuberculosis	29	16	55
No family history of tuberculosis	13	4	31
Family history of vasomotor disturbance	10	9	90

Burning, especially of the one side of the face or one part of the body

Total	61	16	26
Male	22	1	5
Female	39	15	38
10 years and less	1	0	(0)
11 to 20 years	9	2	22
21 to 30 years	30	7	23
31 to 40 years	9	2	22
41 to 50 years	2	1	(50)
51 to 60 years	3	1	(33)
61 to 70 years	2	0	(0)
Stage I	46	13	28
Stage II	8	2	25
Stage III	7	1	14
Class 1	46	13	28
Class 2	11	3	27
Class 3	4	0	(0)
Latent	25	6	24
Arrested	7	2	29
Improving	9	2	22
Stationary	13	4	31
Advancing	7	2	29
Family history of tuberculosis	24	7	29
No family history of tuberculosis	21	12	57
Family history of vasomotor disturbance	9	4	44

Subjective sensations of heat

	NUMBER OF CASES	PRESENT IN	PER CENT
Total	59	14	24
Male	21	1	5
Female	38	13	34
10 years and under	1	0	(0)
11 to 20 years	10	1	10
21 to 30 years	23	6	26
31 to 40 years	10	3	30
41 to 50 years	3	0	(0)
51 to 60 years	3	0	(0)
61 to 70 years	2	0	(0)
Stage I	44	14	32
Stage II	7	0	0
Stage III	7	0	0
Class 1	45	13	29
Class 2	9	1	11
Class 3	4	0	(0)
Latent	23	9	35
Arrested	6	2	33
Improving	8	0	0
Stationary	14	3	21
Advancing	7	0	0
Family history of tuberculosis	23	5	22
No family history of tuberculosis	10	1	10
Family history of vasomotor disturbance	9	2	22

Subjective sensations of cold

Total	56	15	27
Male	21	3	14
Female	35	12	34
10 years and under	1	0	(0)
11 to 20 years	10	0	0
21 to 30 years	29	10	34
31 to 40 years	7	2	29
41 to 50 years	2	0	(0)
51 to 60 years	3	0	(0)
61 to 70 years	2	1	(50)
Stage I	41	11	27
Stage II	8	3	37
Stage III	7	1	14
Class 1	41	12	29
Class 2	10	2	20
Class 3	5	1	20
Latent	20	7	35
Arrested	5	2	40
Improving	9	0	0
Stationary	15	3	20
Advancing	7	3	43
Family history of tuberculosis	24	8	33
No family history of tuberculosis	10	1	10
Family history of vasomotor disturbance	7	3	43

Sweating (exclusive of night sweats)

	NUMBER OF CASES	PRESENT IN	PER CENT
Total	65	29	45
Male	24	7	29
Female	41	22	54
10 years and under	1	0	(0)
11 to 20 years	8	1	12
21 to 30 years	33	15	45
31 to 40 years	8	4	50
41 to 50 years	3	3	(100)
51 to 60 years	2	1	(50)
61 to 70 years	2	0	(0)
Stage I	50	24	48
Stage II	8	2	25
Stage III	7	3	43
Class 1	51	25	49
Class 2	10	4	40
Class 3	4	0	(0)
Latent	29	19	66
Arrested	7	2	29
Improving	6	0	0
Stationary	15	5	33
Advancing	8	3	37
Family history of tuberculosis	26	14	54
No family history of tuberculosis	12	4	33
Family history of vasomotor disturbance	10	8	80

Bleeding

Total	63	16	25
Male	24	4	17
Female	39	12	30
10 years and under	1	0	(0)
11 to 20 years	11	2	18
21 to 30 years	31	11	35
31 to 40 years	8	1	12
41 to 50 years	3	1	(33)
51 to 60 years	3	0	(0)
61 to 70 years	2	0	(0)
Stage I	46	12	26
Stage II	11	4	36
Stage III	6	0	0
Class 1	46	12	26
Class 2	12	4	33
Class 3	5	0	0
Latent	24	8	33
Arrested	9	2	22
Improving	9	2	22
Stationary	15	4	27
Advancing	6	0	0
Family history of tuberculosis	26	9	35
No family history of tuberculosis	11	2	18
Family history of vasomotor disturbance	9	4	44

Angioneurotic edema

	NUMBER OF CASES	PRESENT IN	PER CENT
Total	63	13	21
Male	23	2	9
Female	40	11	27
10 years and under	1	0	(0)
11 to 20 years	11	2	18
21 to 30 years	28	8	28
31 to 40 years	10	3	30
41 to 50 years	3	0	(0)
51 to 60 years	3	0	(0)
61 to 70 years	2	0	(0)
Stage I	46	12	26
Stage II	9	1	11
Stage III	8	0	0
Class 1	45	11	24
Class 2	13	2	15
Class 3	5	0	0
Latent	24	7	29
Arrested	8	3	37
Improving	9	0	0
Stationary	14	3	21
Advancing	8	0	0
Family history of tuberculosis	23	7	30
No family history of tuberculosis	12	3	25
Family history of vasomotor disturbance	8	5	62

Urticaria

Total	63	24	38
Male	21	5	24
Female	42	19	45
10 years and under	1	0	(0)
11 to 20 years	10	2	20
21 to 30 years	28	8	29
31 to 40 years	10	8	80
41 to 50 years	3	2	(67)
51 to 60 years	3	1	(33)
61 to 70 years	2	0	(0)
Stage I	46	21	46
Stage II	9	1	11
Stage III	8	2	25
Class 1	46	21	46
Class 2	13	2	15
Class 3	4	1	(25)
Latent	22	12	55
Arrested	8	4	50
Improving	10	2	20
Stationary	16	6	37
Advancing	7	0	0
Family history of tuberculosis	21	10	48
No family history of tuberculosis	12	5	42
Family history of vasomotor disturbance	7	3	43

Asthma

	NUMBER OF CASES	PRESENT IN	PER CENT
Total	61	9	15
Male	22	3	18
Female	39	6	15
10 years and less	1	0	(0)
11 to 20 years	10	0	0
21 to 30 years	30	3	10
31 to 40 years	10	3	30
41 to 50 years	2	1	(50)
51 to 60 years	3	1	(33)
61 to 70 years	2	0	(0)
Stage I	46	6	13
Stage II	8	2	25
Stage III	7	1	14
Class 1	46	6	13
Class 2	10	3	30
Class 3	5	0	0
Latent	23	4	17
Arrested	6	1	17
Improving	10	1	10
Stationary	13	3	23
Advancing	7	0	0
Family history of tuberculosis	24	3	12
No family history of tuberculosis	13	3	23
Family history of vasomotor disturbance	6	2	33

Hay fever

Total	59	4	7
Male	22	2	9
Female	37	2	5
10 years and less	1	0	(0)
11 to 20 years	10	0	0
21 to 30 years	29	2	7
31 to 40 years	9	1	11
41 to 50 years	2	1	(50)
51 to 60 years	3	0	(0)
61 to 70 years	2	0	(0)
Stage I	45	2	4
Stage II	8	1	12
Stage III	6	1	17
Class 1	44	2	5
Class 2	11	2	22
Class 3	4	0	(0)
Latent	24	2	8
Arrested	7	0	0
Improving	9	0	0
Stationary	13	2	15
Advancing	6	0	0
Family history of tuberculosis	25	2	8
No family history of tuberculosis	12	1	8
Family history of vasomotor disturbance	6	0	0

Migraine

	NUMBER OF CASES	PRESENT IN	PER CENT
Total	74	32	43
Male	23	2	9
Female	51	30	59
10 years and less	1	0	(0)
11 to 20 years	11	4	36
21 to 30 years	32	13	41
31 to 40 years	11	6	55
41 to 50 years	7	5	71
51 to 60 years	3	0	(0)
61 to 70 years	2	0	(0)
Stage I	57	28	49
Stage II	9	3	33
Stage III	8	1	12
Class 1	57	28	49
Class 2	12	4	33
Class 3	5	0	0
Latent	32	20	62
Arrested	9	3	33
Improving	9	0	0
Stationary	16	8	50
Advancing	7	0	0
Family history of tuberculosis	26	12	46
No family history of tuberculosis	18	10	56
Family history of vasomotor disturbance	9	7	73

Clear skin

Total	75	64	85
Male	22	17	77
Female	53	47	89
10 years and under	16	13	81
11 to 20 years	14	12	86
21 to 30 years	23	20	87
31 to 40 years	9	9	100
41 to 50 years	3	3	(100)
51 to 60 years	2	2	(100)
61 to 70 years	2	0	(0)
Stage I	64	55	86
Stage II	6	5	83
Stage III	5	4	80
Class 1	66	56	85
Class 2	6	5	83
Class 3	3	3	(100)
Latent	24	21	87
Arrested	10	10	100
Improving	26	22	85
Stationary	10	9	90
Advancing	5	2	40
Family history of tuberculosis	32	29	91
No family history of tuberculosis	8	8	100
Family history of vasomotor disturbance	5	4	80

Dermographism

	NUMBER OF CASES	PRESENT IN	PER CENT
Total	94	82	87
Male	31	29	94
Female	63	53	84
10 years and under	16	15	94
11 to 20 years	16	15	94
21 to 30 years	35	27	77
31 to 40 years	12	12	100
41 to 50 years	5	4	80
51 to 60 years	2	2	(100)
61 to 70 years	2	2	(100)
Stage I	77	66	86
Stage II	10	9	90
Stage III	7	7	100
Class 1	79	68	86
Class 2	11	10	91
Class 3	4	4	(100)
Latent	33	27	82
Arrested	8	7	87
Improving	26	26	100
Stationary	19	14	74
Advancing	8	8	100
Family history of tuberculosis	35	30	86
No family history of tuberculosis	16	13	81
Family history of vasomotor disturbance	9	7	77

Black line with silver

Total	73	29	40
Male	26	7	27
Female	47	22	47
10 years and under	16	6	37
11 to 20 years	14	5	36
21 to 30 years	24	10	42
31 to 40 years	8	3	37
41 to 50 years	4	2	(50)
51 to 60 years	1	0	(0)
61 to 70 years	4	1	(25)
Stage I	59	26	44
Stage II	9	3	33
Stage III	5	0	0
Class 1	60	26	43
Class 2	11	3	27
Class 3	2	0	(0)
Latent	20	9	45
Arrested	7	4	57
Improving	27	11	40
Stationary	12	3	25
Advancing	7	2	29
Family history of tuberculosis	28	12	43
No family history of tuberculosis	12	4	33
Family history of vasomotor disturbance	6	3	50

Exposure of sclera above or below the cornea in repose

	NUMBER OF CASES	PRESENT IN	PER CENT
Total	87	42	48
Male	33	15	45
Female	54	27	50
10 years and under	16	11	69
11 to 20 years	15	4	27
21 to 30 years	31	15	48
31 to 40 years	9	6	67
41 to 50 years	6	3	50
51 to 60 years	3	0	(0)
61 to 70 years	2	0	(0)
Stage I	66	30	45
Stage II	10	7	70
Stage III	11	5	45
Class 1	69	33	48
Class 2	10	6	60
Class 3	8	3	38
Latent	26	12	46
Arrested	9	4	44
Improving	28	13	46
Stationary	14	8	57
Advancing	10	5	50
Family history of tuberculosis	34	17	50
No family history of tuberculosis	15	9	60
Family history of vasomotor disturbance	8	4	50

Exposure of sclera or of increased amount of sclera above or below the cornea on voluntarily widening the commissure

Total	70	35	50
Male	29	19	66
Female	41	16	39
10 years and under	10	2	20
11 to 20 years	13	6	46
21 to 30 years	29	12	41
31 to 40 years	8	6	75
41 to 50 years	4	3	(75)
51 to 60 years	2	2	(100)
61 to 70 years	1	1	(100)
Stage I	54	25	46
Stage II	8	4	50
Stage III	8	6	75
Class 1	55	24	44
Class 2	8	6	75
Class 3	7	5	71
Latent	23	11	48
Arrested	8	5	62
Improving	20	7	35
Stationary	12	8	67
Advancing	7	4	57
Family history of tuberculosis	27	12	44
No family history of tuberculosis	13	9	69
Family history of vasomotor disturbance	6	2	33

Exposure of sclera or of increased amount of sclera above or below the cornea on fixing the eyes

	NUMBER OF CASES	PRESENT IN	PER CENT
Total	73	10	14
Male	31	7	23
Female	42	3	7
10 years and under	13	2	15
11 to 20 years	12	0	0
21 to 30 years	30	4	13
31 to 40 years	6	0	0
41 to 50 years	4	3	(75)
51 to 60 years	2	0	(0)
61 to 70 years	1	1	(100)
Stage I	55	4	7
Stage II	9	4	44
Stage III	9	2	22
Class 1	57	4	7
Class 2	8	3	37
Class 3	8	3	37
Latent	25	3	12
Arrested	7	0	0
Improving	22	2	9
Stationary	12	3	25
Advancing	7	2	29
Family history of tuberculosis	29	6	21
No family history of tuberculosis	12	2	17
Family history of vasomotor disturbance	6	0	0

Tricolored nails

Total	97	62	64
Male	35	21	60
Female	62	41	66
10 years and under	55	11	20
11 to 20 years	16	11	69
21 to 30 years	39	23	59
31 to 40 years	11	7	64
41 to 50 years	6	5	83
51 to 60 years	3	1	(33)
61 to 70 years	2	2	(100)
Stage I	76	49	64
Stage II	12	6	50
Stage III	9	7	73
Class 1	76	50	66
Class 2	14	6	43
Class 3	7	6	86
Latent	33	22	67
Arrested	9	2	22
Improving	27	22	81
Stationary	19	9	47
Advancing	9	7	73
Family history of tuberculosis	38	22	58
No family history of tuberculosis	17	13	76
Family history of vasomotor disturbance	9	6	67

Thyroid gland

	NUMBER OF CASES	NOT PALPABLE	PER CENT	PALPABLE	PER CENT	SLIGHTLY ENLARGED	PER CENT	MODERATELY ENLARGED	PER CENT	MARKEDLY ENLARGED	PER CENT
Total	99	24	24	36	36	17	17	17	17	5	5
Male	35	8	23	15	43	10	29	2	6	0	0
Female	64	16	25	21	33	7	18	15	39	5	13
10 years and under	19	4	21	11	58	3	16	1	5	0	0
11 to 20 years	16	2	12	3	19	5	31	5	31	1	6
21 to 30 years	38	9	24	12	32	6	16	7	18	4	11
31 to 40 years	10	4	40	4	40	0	0	2	20	0	0
41 to 50 years	7	1	14	5	71	1	14	0	0	0	0
51 to 60 years	2	2	(100)	0	(0)	0	(0)	0	(0)	(0)	(0)
61 to 70 years	2	2	(100)	0	(0)	0	(0)	0	(0)	0	(0)
Stage I	79	18	23	26	33	14	18	16	20	5	6
Stage II	12	4	33	5	42	2	17	1	8	0	0
Stage III	8	2	25	5	62	1	13	0	0	0	0
Class 1	78	17	22	27	36	14	18	15	19	5	6
Class 2	15	6	40	5	33	2	13	2	13	0	0
Class 3	6	1	17	4	66	1	17	0	0	0	0
Latent	34	8	24	11	32	4	12	8	24	3	9
Arrested	9	1	11	4	44	3	33	0	0	1	11
Improving	27	5	19	10	37	7	26	5	19	0	0
Stationary	20	6	30	7	35	2	10	4	20	1	5
Advancing	9	4	44	4	44	1	11	0	0	0	0
Family history of tuberculosis	37	7	19	16	43	4	11	8	22	2	5
No family history of tuberculosis	16	6	38	3	19	4	25	2	12	1	6
Family history of vasomotor disturbance	8	2	25	3	37	1	12	1	12	1	12

	PALLOR	INVOLUNTARY ELEVATION OF EYEBROWS ON VOLUNTARILY WIDENING COMMISSURE	OTHER VASOMOTOR SYMPTOMS
Total	36	24	28
Male	7	13	4
Female	29	11	24
10 years and less	2	3	0
11 to 20 years	6	4	2
21 to 30 years	21	9	13
31 to 40 years	5	4	7
41 to 50 years	1	2	2
51 to 60 years	1	1	0
61 to 70 years	0	0	0
Stage I	31	18	25
Stage II	2	4	2
Stage III	3	2	1
Class 1	32	19	26
Class 2	2	3	2
Class 3	2	2	0
Latent	19	7	15
Arrested	6	5	1
Improving	3	8	1
Stationary	4	3	10
Advancing	4	1	1
Family history of tuberculosis	14	12	9
No family history of tuberculosis	7	4	7
Family history of vasomotor disturbance	3	1	7

per cent), burning, especially of one side of the face or one part of the body (26 per cent), bleeding (25 per cent), subjective sensations of heat (24 per cent), non-palpable thyroid gland (24 per cent), angioneurotic edema (21 per cent), slight enlargement of thyroid gland (17 per cent), moderate enlargement of thyroid gland (17 per cent), asthma (15 per cent), exposure of sclera or of increased amount of sclera above or below the cornea on fixing the eyes (14 per cent), hay fever (7 per cent), and markedly enlarged thyroid gland (5 per cent).

Many of the phenomena seemed influenced by sex. The percentages in males and females did not differ over ten points in asthma, hay fever, dermographism, exposure of sclera normally, tricolored nails, non-palpable thyroid gland, and palpable thyroid gland. The marked differences, beginning with the greatest, are migraine: males 9 per cent, females 59 per cent; burning: males 5 per cent, females 38 per cent; moderately enlarged thyroid gland: males 6 per cent, females 39 per cent; flushing: males 29 per cent, females 59 per cent; subjective sensations of heat: males 5 per cent, females 34 per cent; exposure or increased exposure of sclera on widening the commissure: males 66 per cent, females 39 per cent; sweating (exclusive of night sweats): males 29 per cent; females 54 per cent; urticaria: males 24 per cent, females 45 per cent; subjective sensations of cold: males 14 per cent, females 34 per cent; black line wth silver: males 27 per cent, females 47 per cent; angioneurotic edema: males 9 per cent, females 27 per cent; exposure or increased exposure of sclera on fixation: males 23 per cent, females 7 per cent; bleeding: males 17 per cent, females 30 per cent; markedly enlarged thyroid gland: males none, females 13 per cent; clear skin: males 77 per cent, females 89 per cent; slightly enlarged thyroid gland: males 29 per cent, females 18 per cent. Of those not calculated in percentages, pallor was noted in 7 males and 29 females, other vasomotor symptoms in 4 males and 24 females, and involuntary elevation of eyebrows on voluntarily widening the commissure in 13 males and 11 females. Every phenomenon appeared more frequently in females than in males, except the exposure or increased exposure of the sclera on widening the commissure and on fixing the eyes, raising the eyebrows on widening the commissure, and slight enlargement of the thyroid gland.

The division into different age periods also shows some differences. Subjective sensations of cold, sweating, and especially tricolored nails and exposure or increased exposure of the sclera above and below the cornea on widening the commissure were less frequent in children under

eleven years, as were moderate enlargement of the thyroid gland which was also less between the ages of forty-one and fifty, and marked enlargement of the thyroid which was also less between the ages of thirty-one and fifty. Flushing appeared more frequently in children under eleven, as did exposure of the sclera above or below the cornea normally, which also appeared more frequently between the ages of thirty-one and forty, and palpable thyroid gland, which also appeared more frequently between the ages of forty-one and fifty. Subjective sensations of heat and hay fever were experienced less often under the age of twenty-one and exposure of the sclera above or below the cornea normally and a palpable thyroid gland less often between the ages of eleven and twenty. Slight and moderate enlargement of the thyroid gland, however, both occurred more frequently between the ages of eleven and twenty. Inability to palpate the thyroid was observed least between the ages of eleven and twenty and of forty-one and fifty, and bleeding least below twenty years and especially between thirty-one and forty. Urticaria was observed most seldom below thirty years but especially below twenty years and dermographism was noted least between twenty-one and thirty years. Bleeding, marked enlargement of the thyroid, pallor, elevation of the eyebrows on widening the commissure, and other vasomotor symptoms were most marked in the age period between twenty-one and thirty, and angioneurotic edema between twenty-one and forty. None of the patients between the ages of thirty-one and forty had an enlarged thyroid, while in that age period asthma, hay fever, clear skin, dermographism, exposure or increased exposure of sclera above or below the cornea on widening the commissure, and a non-palpable thyroid were most frequently found. Urticaria and migraine were most pronounced between thirty-one and fifty, the former especially between thirty-one and forty and the latter especially between forty-one and fifty. Tricolored nails occurred most frequently between the ages of forty-one and fifty years.

The stage of the disease had an influence on a number of the phenomena. Subjective sensations of heat, angioneurotic edema, pallor, raising of the brows on widening the commissure, moderate and marked enlargement of the thyroid gland, and other vasomotor symptoms occurred chiefly in patients in the first stage. Flushing, migraine and a black line with silver, while most common in first stage cases, also occurred in many patients in the second stage; while urticaria, which also affected mostly patients in the first stage, was observed to a considerable

extent in the third stage. Burning affected chiefly first and second stage patients, as did bleeding, which was more common in the second stage. Sweating and tricolored nails were phenomena of both the first and second stages; while all three stages showed a clear skin, slight enlargement of the thyroid gland, and dermographism, the latter occurring most frequently in the third stage and next in the second stage. Most frequent in patients in the second stage were subjective sensations of cold, asthma, normal exposure of the sclera above or below the cornea, and exposure or increased exposure on fixation, and a thyroid gland that could not be palpated. Hay fever was present in both the second and third stages. Third stage patients exhibited exposure or increased exposure of sclera above or below the cornea on widening the commissure and a palpable thyroid gland much oftener than the others.

When divided according to the amount of pulmonary involvement, patients in class one were those chiefly affected with flushing, subjective sensations of heat and cold, angioneurotic edema, urticaria, migraine, pallor, raising of the eyebrows on widening the commissure, and other vasomotor symptoms. In the first and second classes burning, sweating, moderate enlargement of the thyroid gland, and a black line with silver were observed, the last being more frequently found in the first class. In all three classes there were present a clear skin, a slightly enlarged thyroid gland and dermographism, the last being most marked in the third class and least in the first. Tricolored nails were observed in the first and third classes. Bleeding, asthma, hay fever, exposure of the sclera above or below the cornea normally, and a non-palpable thyroid occurred chiefly in the second class. In the second and third classes the sclera above or below the cornea was exposed or more exposed on widening the commissure and on fixing the eyes; while in the third class the thyroid was palpable.

The progress of the disease seemed to exert an influence on some of the phenomena. Flushing, burning, a clear skin, dermographism, a black line with silver, exposure of the sclera above or below the cornea normally and on widening the commissure, elevation of the eyebrows on widening the commissure, tricolored nails, and non-palpable, palpable and enlarged thyroid gland were present in each group. Flushing, however, was met with oftener in latent, improving and especially advancing cases. Burning was somewhat less frequent in latent and improving cases, and elevation of the eyebrows somewhat less frequent in arrested, stationary and especially in advancing cases. A clear skin was observed

oftenest in arrested cases and least in advancing cases. Dermographism existed in all the improving and advancing cases and in fewest of the stationary cases. A black line with silver was noted most frequently in arrested cases and least in stationary and advancing cases. Exposure of the sclera above or below the cornea was noted most in stationary and especially in advancing cases when normally present, most in arrested, stationary and to some extent in advancing cases and least in improving cases when occurring on widening, and most in stationary and advancing cases and least in improving cases when occurring on fixing the eyes. The nails were tricolored most often in advancing and especially in improving cases and least often in stationary and especially in arrested cases. A thyroid that was not palpable was recorded to some extent more in stationary and to a considerable extent more in advancing cases and less in improving and least in arrested cases. A palpable thyroid gland was felt more in arrested and advancing cases and slightly less in latent cases. The thyroid gland was slightly enlarged more frequently in improving and especially in arrested cases and less frequently in the other groups. Pallor was noted chiefly in latent cases. Hay fever and other vasomotor symptoms were present chiefly in latent and stationary cases, hay fever occurring oftener in the latter and vasomotor symptoms oftener in the former. Subjective sensations of heat, angioneurotic edema, migraine, and a markedly enlarged thyroid gland were noted especially in latent, arrested and stationary cases, migraine occurring more frequently in stationary and especially in arrested cases and marked enlargement of the thyroid in latent and especially in arrested cases. Bleeding, urticaria and asthma were experienced in all but advancing cases, urticaria occurring oftener in stationary and especially in latent and arrested cases, asthma oftener in stationary and less in improving cases. Subjective sensations of cold and sweating appeared in all but improving cases, the former being more marked in latent, arrested, and advancing cases, the latter especially in latent cases. Exposure or increased exposure of the sclera above or below the cornea on fixing the eyes was noted in all but arrested cases, being more prominent in stationary and advancing cases. The thyroid gland was moderately enlarged in latent, improving and stationary cases, especially in the first.

Flushing, subjective sensations of heat and especially of cold, sweating, bleeding, dermographism, a black line with silver, exposure of the sclera above or below the cornea on fixation, palpable and moderately enlarged thyroid gland occurred more frequently in patients with a family his-

tory of tuberculosis, while burning, asthma, migraine, pallor, exposure of the sclera above or below the cornea normally and on widening the commissure, elevation of the eyebrows on widening the commissure, tricolored nails, a thyroid not palpable or slightly enlarged were observed oftener in patients with no tuberculosis in the family. Angioneurotic edema, urticaria, hay fever, marked enlargement of the thyroid gland, and other vasomotor symptoms showed no change.

The few patients who gave a family history of vasomotor disturbances exhibited angioneurotic edema three times as often as the patients as a whole, and flushing, burning, subjective sensations of cold, sweating, bleeding, asthma, migraine, and marked enlargement of the thyroid gland about twice as often. They showed practically no difference in regard to subjective sensations of heat, clear skin, exposure of sclera above or below the cornea normally, tricolored nails, and non-palpable and palpable thyroid gland. Urticaria and a black line with silver occurred a little more frequently and dermographism, exposure or increased exposure of the sclera on widening the commissure, and slight and moderate enlargement of the thyroid gland somewhat less frequently than in the patients as a whole. Hay fever and exposure or increased exposure of the sclera above or below the cornea on fixing the eyes occurred in none, and pallor, elevation of the eyebrows on opening the eyes widely, and other vasomotor symptoms in very few. The number giving a history of vasomotor disturbance in the family never exceeded ten in any group and no note was made as to the absence of such history in any case. Consequently the figures must be regarded merely as suggestive.

DISCUSSION

Signs and symptoms of autonomic disturbance occur quite commonly in pulmonary tuberculosis. One hundred and nineteen patients were examined for twenty-six different phenomena, only those who gave a history of the presence or absence of each phenomenon being included in each investigation. In twenty-three instances the number examined seemed sufficiently large to admit of percentage calculations, the number in those groups varying from fifty-six to ninety-nine and more than half being seventy or over. Seventy-five per cent or more had dermographism, a clear skin and a thyroid gland that was palpable or more or less enlarged. Between 50 and 75 per cent showed tricolored nails and exposure or increased exposure of the sclera above or below the cornea

on voluntarily widening the commissure. Between 25 and 33 per cent exhibited flushing, burning, subjective sensations of cold, bleeding, migraine, sweating, urticaria, exposure of the sclera normally above or below the cornea, a black line with silver, and palpable thyroid gland. In between 14 and 25 per cent were noted subjective sensations of heat, angioneurotic edema, asthma, exposure or increased exposure of the sclera above or below the cornea on fixing the eyes, a non-palpable thyroid gland, slight enlargement of the thyroid, and moderate enlargement of the same gland. In between 5 and 7 per cent were observed hay fever and marked enlargement of the thyroid gland.

Eight of the phenomena were little influenced by sex. The percentage of females was more than six times that of males having migraine, burning, subjective sensations of heat, and moderate and marked enlargement of the thyroid gland. The percentage of females was three times that of males exhibiting angioneurotic edema, and from a little less than twice to a little more than twice that of males showing sweating, urticaria, subjective sensations of cold, a black line with silver, and bleeding. Pallor and involuntary raising of the eyebrows on widening the commissure were also observed much more in females than in males. On the other hand, the percentage of males with exposure or increased exposure of sclera above or below the cornea on fixing the eyes was three times that of females, and with exposure or increased exposure on widening the commissure nearly twice that of females, and with slightly enlarged thyroid considerably more than the percentage of females.

It does not seem possible to generalize concerning the different age periods. Subjective sensations of heat and cold, sweating, bleeding, exposure or increased exposure of the sclera above and below the cornea on widening the commissure, tricolored nails, and moderate and marked enlargement of the thyroid gland are met with in the young. Urticaria, asthma, hay fever, clear skin, dermographia, exposure of the sclera above or below the cornea normally and on widening the commissure, and a non-palpable thyroid gland were most common between the ages of thirty-one and forty years.

The great majority of the autonomic phenomena occurred most frequently in the first stage, although bleeding, subjective sensations of cold, asthma, exposure of the sclera above or below the cornea normally and on fixation, and a non-palpable thyroid gland were most common in the second stage, and dermographism, exposure or increased exposure of the sclera above or below the cornea on widening the commissure,

and a palpable thyroid gland were met with oftenest in the third stage.

In the first class of Turban also more phenomena were observed, although bleeding, asthma, hay fever, exposure of the sclera above or below the cornea normally, and a non-palpable thyroid gland occurred more frequently in the second class and dermographism and palpable thyroid in the third class.

It is rather difficult to analyze the cases when divided according to the progress of the disease. Subjective sensations of heat, angioneurotic edema, urticaria, asthma, migraine and marked enlargement of the thyroid gland occurred chiefly in latent, arrested and stationary cases. Hay fever and other vasomotor symptoms were present and bleeding was more pronounced in latent and stationary cases.

No deductions at all can be drawn from the figures obtained after dividing the cases according to the existence or not of a history of tuberculosis in the family.

While the number of cases giving a family history of vasomotor disturbances is too small to admit of making any generalizations, it would appear that such cases exhibit autonomic subjective symptoms in great excess of tuberculous patients taken as a whole but, with the exception of markedly enlarged thyroid gland, present the objective signs of such disturbance in about the same proportion as other cases.

As to what significance is to be attached to these various signs and symptoms of autonomic disturbance that occur so frequently in pulmonary tuberculosis, I do not feel justified at present in venturing a definite opinion. My feeling is that they are due to an excess in the system of one or more of the internal secretions, due to the stimulation of the thyroid gland and other endocrine glands by the tuberculous poison and are evidences of a defense reaction. In latent and arrested cases it is possible that the endocrine glands, which were stimulated to hypersecretion (and possible hypertrophy) by the tuberculous toxin, still continued to secrete in excess of the normal after the disease was checked, this excessive secretion giving rise to the various phenomena of autonomic disturbance. It is possible that in improving and advancing cases the endocrine glands are also sending large amounts of internal secretions into the system, while in others these glands have become more or less exhausted. Stationary cases seem to me to tend to agree more in their autonomic phenomena with latent and arrested cases than with improving and advancing cases.

MEDICAL NOTES, ABSTRACTS AND REVIEWS

It will be the eventual purpose of the REVIEW thoroughly to canvass all literature on tuberculosis as it appears in other medical periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the Abstract Editor, Dr. George Mannheimer, 41 West 51st Street, New York, N. Y. In the present number many of the abstracts have been taken from other medical publications, such as the Journal of the American Medical Association, the Medical Record, the New York Medical Journal, etc., to whom acknowledgment is due.

Abortive Cases.—Glover discusses the significance of that large group of cases which he chooses to call "abortive" cases in which the symptoms looking toward tuberculosis may be slight and indefinite and may soon entirely pass away. He divides such cases into four groups, as follows:

Group 1. Cases of tuberculous infection without symptoms and with a minimal lesion, healing almost spontaneoulsy, and usually found accidentally postmortem, if at all.

Group 2. Tuberculous lesions of definite extent but without symptoms, found postmortem.

Group 3. Tuberculous lesions of definite extent, and with slight symptoms, healing within a few weeks, not usually diagnosed as tuberculosis, but considered to be "feverish colds."

Group 4. Tuberculous lesions with decided symptoms either (a) with bacilli in the sputum or (b) without bacilli in the sputum (when present) becoming completely healed in three months.

These four groups according to his idea would be subdivisions of the first or incipient group in the national classification. He believes that the present system of classification of cases, based primarily upon anatomical changes, is an unsatisfactory one. While the scheme which he proposes is not altogether satisfactory, it is certainly important to make some definite grouping of these cases of very early tuberculous disease.—*The Significance of "Abortive" Cases in the Classification of Pulmonary Tuberculosis, Glover, Practitioner, November, 1916.*

Early Diagnosis.—Since we must diagnose tuberculosis before physical signs make their appearance the history becomes more important than the physical examination. A history of exposure, a past history of measles, whooping-cough, pleurisy, influenza, bronchitis, fever, and neurasthenia, are of definite importance. Persistent fever as well as continued subnormal temperature with rapid pulse are equally important. Pottenger's muscle-spasm sign is of great value. Auscultation is the most delicate of all methods of physical examination. The x-ray plate alone does not tell us whether the process is active or inactive; but where the presence of disease is established, the x-ray shows the extent of involvement.—*A Few Remarks Concerning the Diagnosis of Early Pulmonary Tuberculosis, G. Halperin, Chicago M. Rec. November 16, 1916.*

Diagnostic Significance of Subfebrile Temperatures.—Among the affections in which subfebrile temperatures were found, the first place must be awarded to tuberculosis. Even at the first examination one finds with these temperatures distinct pathological changes in the lungs of tuberculous origin in 41 per cent. To this percentage must be added 10 per cent in which tuberculosis is revealed on later examination during the ensuing ten-year period. In this fraction the first examination had revealed only evidences of neurasthenia, Graves's disease or chlorosis to explain the temperature. Hence a little over one-half of all subjects with subfebrile temperatures suffer from active or latent tuberculosis. Of the remaining one-half, 32 per cent, or about a third of the total number, present evidences of gastric ulcer, constipation, neurasthenia, chlorosis and myalgia, while only 16 per cent suffer from chronic inflammatory processes of non-tuberculous nature. Of the patients with manifest tuberculosis, but few of whom receive proper management, one-third perish in from one to six years, one-third show at remote period (eight to fifteen years) distinct evidences of tuberculous alterations and one-third seemingly recover. Of the 10 per cent of latent cases only a

small fraction—one-fifth—die; the remainder present ten years later only minimal residues of the disease. The conclusions are based on a study of over 400 cases, and the range of subfebrile temperature is reckoned at 37.1° to 37.9°C. (98.8° to 100.2° F.). Temperatures were taken twice daily over very long periods—sometimes for many years. According to this conception of a subfebrile temperature, many clincal types are excluded from consideration, in which we see a slightly higher range of temperature over a relatively short time. Chief among these is the so called chronic influenza in which subfebrile temperature may persist for weeks.—*Diagnostische Bedeutung subfebriler Temperaturen, Schlayer, Zeitschr. f. Klin. Med., lxxxiii, nos. 3–4, 1916.*

Constitutional versus Local Signs and Symptoms.—A letter of inquiry was sent out to fifty physicians engaged in tuberculosis work with a view of ascertaining the relative value they attach to constitutional as against local signs and symptoms in the diagnosis of early tuberculosis.

Question 1. Do you get most information from the constitutional or local signs and symptoms? Thirty one answered from the "constitutional" and 15 from the "local." Many qualified their answers, as follows: In infants and young children we obtain most information from the constitutional signs and symptoms; in adults the individual case must answer the question. Cases of hyperthyroidism, incipient Addison's disease, anemias and leukemias are often diagnosed as tuberculosis from the constitutional signs alone; while cases of bronchiectasis, subacute bronchitis, syphilis and non-tuberculous areas in the lungs are diagnosed as tuberculosis from the local signs alone.

Question 2. What group of signs and symptoms are most often neglected? Thirty-six stated that the constitutional signs and symptoms are most often neglected; five were in doubt and seven stated the "local."

Question 3. Would you make a diagnosis on constitutional signs with negative or nearly negative chest findings? Twenty-three answered "yes" and 23, "no."

Question 4. Would you make a definite diagnosis on signs and symptoms referred to the lungs alone, if the history and constitutional signs were negative? Twenty-eight out of 46 answers were in the affirmative. Five said "yes," but only if the lung signs persisted.

Question 5. In cases with a negative or absent sputum what do you demand before you are willing to make a definite diagnosis of incipient pulmonary tuberculosis? Most of the answers were as expected, that before a definite diagnosis can be made in such case, there must be both local and constitutional signs and symptoms.

The author's own replies, based on the analysis of 200 cases favor the constitutional signs and symptoms. Excluding the cases with history of hemorrhage, of which there were 87, he finds that he had based his diagnoses in 31 cases on purely local signs, and in only 26 cases on the history and constitutional signs and symptoms. In the remaining 136 cases the diagnosis was based on both constitutional and local signs. Fifty-three per cent of these 200 cases had either no cough or no sputum; 34.3 per cent had no chest signs. No one or no two signs or symptoms are essential to a correct diagnosis. The stethoscope used less and the thermometer and common sense used more, would vastly better the present state of affairs.—*"Constitutional" versus "Local" Signs and Symptoms in the Diagnosis of Early Pulmonary Tuberculosis, J. B. Hawes, 2nd, Boston M. and S. J., March 1, 1917, clxxvi, no. 9.*

X-Ray Diagnosis.—The present status of the Roentgen diagnosis of pulmonary tuberculosis is most encouraging, and in the future will become more and more exact. Whenever phthisis is suspected or where the physical signs and clinical evidence are doubtful, a Roentgen examination is absolutely necessary. Although pulmonary phthisis is often easily diagnosed by clinical methods, nevertheless, the Roentgen ray so frequently reveals new or unexpected conditions, that in the future no case will be considered as having been thoroughly and completely examined until a Roentgen examination has been made.—*The Roentgen Ray in the Diagnosis of Pulmonary Tuberculosis, J. Daland, N. York M. J., February 3, 1917, cv, no. 5.*

Diagnostic Findings on Repeated Skin Tuberculin Tests.—Lindberg has applied repeated skin tuberculin tests to 129 children in the hospital and sanatorium with which he is connected. The ages ranged from one to twelve years. The tuberculin skin test was applied to each arm and again after an interval of a week. The reaction twenty-four hours after the test and a week later, was measured in both the axial and transverse diameters. When neither diameter was over 5 mm. the reaction was recorded as negative. The findings are tabulated for the entire number, with further details as to the general condition, etc. Of the 129 children, 33.3 per cent showed a much more pronounced response

at the second double test than at the first. In 60 per cent the response was weaker than at the first; in 6.7 per cent there was but slight difference.

Classifying the cases in three groups as certain active tuberculosis, probable tuberculosis, and the nontuberculous, he found this intensification of the reaction, or positive sensitization, in only 5.3 per cent of the 36 cases in the first group; in 28.5 per cent of 16 in the probable group, and in 78 per cent of the 18 nontuberculous. These data confirm the assumption of a connection between this sensitization and the phases of tuberculosis, in that as a rule the response to the second application of the test is weaker when there is active tuberculosis, and stronger when it is latent. Of the total 129 children, 75 had given a positive response when first tested. In Bessau-Schwenke's research along similar lines, 129 of 153 children had responded with a positive reaction in the Pirquet test. The proportional findings with the repeated tests harmonized in both series, confirming the reliability of the above deductions. In a further series, the positive sensitization was obtained in only 15 per cent of 20 children with manifest tuberculous processes in bones or joints. A fourth table gives the findings in 15 supposedly healthy children and 15 healthy adults.

The results of the whole research testify that with inactive tuberculosis the response to the repetition of the tuberculin skin test is more pronounced than at the first test, while the reverse is the rule with active tuberculosis. The attenuation of the response to a second application of the test has thus a favorable instead of an unfavorable significance. He found it most instructive to record the sum of the diameters of the reaction including both the twenty-four hour and one week measurements.—*Modification of Skin Tuberculin Reaction after Repeated Application of this Test. (Iakttagelser över tuberkulinsensibiliseringen vid v. Pirquets reaktion och dess diagnostiska betydelse.) G. Lindberg, Hygiea, lxxviii, no. 20, 1916.*

Detection and Treatment of Tuberculosis in Children.—The treatment of tuberculosis in children must include prevention of repeated infection as well as measures to strengthen the resisting powers besides systematic specific treatment. Every child known to be exposed to tuberculosis can be regarded as already infected. The more sensitive to toxic influences the child's organism, the greater the production of antibodies, and hence the tuberculous process does not spread so rapidly, but the various functional disturbances from the toxins are more pronounced. Such children are frail but they may live their whole life without the tuberculosis becoming manifest. Only when in consequence of unhygienic conditions, alcoholism, measles or pregnancy the immunity is lowered is the tuberculosis able to get the upper hand. Sad examples of this are found in the soldiers with previously latent tuberculosis who return from the front with pulmonary phthisis.

Latent tuberculosis in children is often revealed by defects in development. The previously normal appearing child begins to grow thin and pale, the skin and muscles feel flabby, and the bones are inclined to soften and bend. The mind often develops precociously and the children are known as good scholars, while others are correspondingly backward. Children with latent tuberculosis "catch cold" readily, eczema and pruritus are frequent and there may be periods of some difficulty in breathing with or without bronchial catarrh. Pains at different points are also instructive; by simulating appendicitis they have been known to lead to an unnecessary operation. Owing to the influence of the tuberlosis toxins on the genital organs, the picture of puberty may differ entirely from normal. These toxins can act on the glands with an internal secretion either to irritate them to exaggerated functioning or to inhibit their functioning, which explains why one child may grow tall and spindling under their influence while another may be short and stout. There may be extreme emaciation or there may be obesity, premature or long retarded puberty, frequent profuse menstruation or the menses may not commence until the sixteenth or eighteenth year or later and then occur at long and irregular intervals. In boys, early and repeated pollutions and sexual nervousness at puberty should arouse suspicion of latent tuberculosis.

All these disturbances in tissues and functions which are induced by tuberculous infection in the growing child, form as a whole the clinical picture of Stiller's "universal asthenia." Others call it the "lymphatic temperament." All seem to regard it as an inherited, congenital predisposition, a substandard constitution, when in fact it is merely the sum total of the disturbances induced by tuberculous infection during childhood. It is not a congenital *anlage* and an inherited body frame, but it is the result of the insidious sapping of an acquired disease. And this is under our control if we recognize and attack it early enough with specific treatment.—*Erkennung und Heilung der Tuberkulose im Kindesalter, J. Hollos, Zeitschr. f. Tuberk., November, 1916.*

Bovine Infection In Children.—Chun Yik Wang summarizes the following facts:

1. A bacteriological investigation in 281 cases of various clinical forms of tuberculosis in Edinburgh conducted by various workers has resulted in the isolation of the bovine tubercle bacillus in 80 out of 102 cases (78.4 per cent) under the age of five years; in 45 out of 64 cases (70.3 per cent) under sixteen years; and in 9 out of 115 cases (7.8 per cent) above sixteen years. These percentages of bovine tuberculosis are higher than those obtained in England and elsewhere.

2. The most fatal tuberculous affections in childhood, especially in early infancy, are abdominal and meningeal tuberculosis. They together are responsible for about 90 per cent of the summed mortality from tuberculosis in children under one year and about 75 per cent in children between one and five years. Material from nine children dead from these two diseases was examined bacteriologically, and from six the bovine type of tubercle bacillus was isolated.

3. A large percentage of children in Edinburgh are fed wholly or partly on cow's milk, and in great number of instances it is consumed raw. These two incidents, together with high percentage of tuberculous cow's milk, gives an explanation of the prevalence of abdominal tuberculosis in Edinburgh.

4. Children who were bottle fed on raw milk give a higher percentage of tuberculin reactions (37.5 per cent) as against 15.4 per cent of those fed on boiled cow's milk.

5. The material submitted to the investigation came from children of the poorer class, and the results arrived at should, therefore, not be considered as strictly applicable to the community in general, nor must they be taken to represent the conditions prevailing in localities where the environment might be wholly different.—*Incidence of Bovine Infection of Tuberculosis in Children, Chung Yik Wang, Edinb. M. J., March, 1917, xviii, no. 3, 178.*

Primary Infection in the Pharynx.—Tuberculous infection of the pharynx occurs much more frequently than is commonly believed and is a much greater factor in the causation of pulmonary tuberculosis than physicians realize. Many cases of infection can be arrested by careful and early attention to the pharynx, which if neglected later involves the glands, lungs, meninges or other vital structures. The most frequent sites of invasion of tubercle bacilli in the human subject is that of the lymphatic follicles of the pharyngeal structures from which they find their way through the lymph or blood streams into other less resistant tissues, without ever really involving the surrounding pharyngeal tissue sufficiently to produce a typical tuberculous lesion. The anatomy of the lymphatic vessels of the throat and chest is such that an infection of one can be easily communicated to the other. Experiments have shown that when a fixed stain such as india ink is injected into the tonsil, or other pharyngeal tissues of animals, in a comparatively short time the stain is diffused throughout the lungs. Any chronic inflammatory condition of the pharynx should be seriously considered as affording opportunity for easy entrance and propagation of the tubercle bacilli, and as a prophylactic measure the tonsils should always be removed if they present a condition of chronic inflammation. Enlarged pharyngeal tonsils, commonly designated as adenoid vegetations, are fertile fields for infection. Enlarged lingual tonsils cause irritation and even ulceration of the epiglottis and are a source of danger to a tuberculous patient. The most important pathological condition is chronic follicular pharyngitis which is most often caused by the streptococcus but may be due to infection with any organism. Specimens removed from such throats showed the presence of tuberculous changes.—*The Pharynx as a Point of Primary Infection in Tuberculosis, R. R. Brownfield, Southwestern Medicine, February, 1917, i, no. 2.*

Laryngeal Tuberculosis.—The pamphlet constitutes a review of the writer's investigations in laryngeal tuberculosis carried on during the past three years at the New York Municipal Sanatorium, Otisville, N. Y. This institution cares for 600 patients suffering from pulmonary tuberculosis, and affords an excellent opportunity to study laryngeal complications. Out of 500 patients examined at the sanatorium laryngeal tuberculos's was found in 128 or 25.6 per cent of the cases. No tuberculosis of the larynx was found among 100 children examined.

Tuberculosis of the larynx is caused by direct invasion of the mucous membrane of the larynx by the tubercle bacillus, but a predisposing cause is almost as essential as the direct cause, and anything that tends to congestion and chronic catarrhal inflammation of the larynx should be considered as a predisposing factor. Among the predisposing causes are age and sex, nasal obstruction, accessory sinusitis, chronic pharyngitis, tonsillitis, frequent attacks of rhinitis, abuse of the voice, cough, use of tobacco or alcohol and syphilis.

Pathologically there are three distinct types of laryngeal tuberculosis: acute, subacute and chronic. The recognition of the character of the lesion is one of the chief determining factors in prognosis.

Cases of the acute and subacute types have symptoms referable to the larynx and the diagnosis as a rule is easily made. On the other hand, cases of the chronic type very seldom suffer from annoying symptoms, and only on close scrutiny can the lesion be detected.

One of the important conclusions arrived at, is that the frequency with which a part is affected is in direct proportion to the amount of trauma that part receives as a result of its location and its functional activity. The above is fully corroborated by the results of the study presented, in which it is shown that the most frequent site of involvement is the interarytenoid space, followed in order of frequency by the vocal processes, arytenoid cartilages, vocal cords, ventricular bands, epiglottis and ary-epiglottidean folds.

Every large tuberculosis sanatorium should have a competent resident laryngologist to observe the patients.

The general management of tuberculous laryngitis should be the same as that of pulmonary tuberculosis. Vocal rest, although absolutely essential in acute inflammatory conditions of the larynx, may be gradually dispensed with as the lesion becomes fibrous. Prevention of tuberculous laryngitis is as important, if not more so, than its actual treatment.

In each building of the sanatorium the following notice is posted for the information and guidance of the patients:

Patients with pulmonary tuberculosis not infrequently develop tuberculosis of the larynx, but like tuberculosis elsewhere in the body, it can be prevented.

To prevent tuberculosis of the larynx patients are advised:

(1) Always to breathe through the nose. Mouth breathing is a bad habit. If you cannot breathe through your nose there is cause which needs treatment.

(2) Refrain from abuse of voice, such as shouting, singing and excessive talking.

(3) Cough as little as possible. Coughing irritates the throat.

(4) Patients subject to colds or sore throats can often be helped by prompt medical attention.

(5) Abstain from the use of tobacco and alcohol. These act as direct irritants to the throat.

(6) Patients having the slightest trouble in the nose or throat should consult the doctor.—*Laryngeal Tuberculosis. A Three Years' Study, J. Dworetzky, Monograph, published by the Dpt. of Health of N. Y. City, September 1916.*

Tuberculosis of Larynx and Mouth.—Presentation of a forty-six-year-old man, suffering from pulmonary and laryngeal tuberculosis and a very extensive tuberculous ulceration of the buccal mucous membrane. The larynx healed under climatic treatment, but the lesion in the mouth withstood all therapeutic efforts, even the application of the x-ray.—*Tuberculosis of the Larynx and Mouth, W. W. Carter, The Laryngoscope, March 1917, xxvii, no. 3, 170.*

Preventing Laryngeal Phthisis.—Laryngeal involvement occurs in 25 to 30 per cent of pulmonary tuberculosis. The salient points in its prevention are:

1. Stop excessive cough; 2. Stop excessive use of voice; 3. Stop smoking; 4. Correct abnormalities of nose and pharynx; 5. Cleanse larynx with an alkaline antiseptic spray containing 0.5 per cent formalin, followed by an oil spray of camphor and menthol.—*Possibility of Preventing Laryngeal Phthisis, S. H. Watson, Ariz. Med. Jour., May 1916.*

Influenza vs. Tuberculosis.—Many respiratory diseases following grippe are not correctly diagnosed because of our failure so far to recognize the origin of such disorders.

Some of these cases, especially when accompanied by hemoptysis, pleurisy, etc., are frequently mistaken for pulmonary tuberculosis, often to the detriment of the patient.

Failure to recognize and properly treat latent grippe exposes the patient to the danger of serious complications through unguarded exposures, etc. The triad of extreme asthenia with no apparent cause to explain it, anorexia, and unusual sensitiveness to changes of temperature, occurring during an epidemic of grippe, in the absence of neurasthenia or any febrile disorder, is quite pathognomonic of latent grippe.

Rest and avoidance of exposure are among the most effective means at our command for the prevention of severe relapses and dangerous complications in grippe. They must be enforced not only during the height of an acute attack, but also during the period of convalescence, as well as in latent, sub-acute and chronic grippe. In this way many of the chronic respiratory diseases following grippe could also be prevented.

For the treatment of such chronic influenza, besides all available measures for the building up of the general health—which would include improved hygienic surroundings, such as residence in the country, removal from all sources of worry, etc.—autogenous vaccines should also be employed, taking all the necessary precautions to guard against any possible dangers from anaphylactic reactions.—*Influenza versus Tuberculosis, B. Frankel, N. Y. M. J., January 27, 1917, cv, no. 4.*

Gland Index in Tuberculosis.—There is abundant pathologic evidence to prove the frequency of enlargment of the bronchial and cervical glands in small children in cases of early pulmonary tuberculosis, and also as a primary manifestation of the disease in cases in which the lungs have not been affected. It would seem probable, moreover, both on clinical and pathologic grounds, that tuberculous infection in small children tends to enter the system via the upper part of the alimentary canal, the mouth, tonsils, fauces, etc., rather than through the respiratory tract. This would explain the frequency with which children exposed in their homes to infection from consumptive parents are found to suffer from tuberculous cervical glands. It was a constantly recurring experience to obtain from school children, showing glandular enlargement in a marked degree, the clearest possible recent history of tuberculosis contact. No prolonged examination of individual cases was made; the children were placed in lines and examined in succession by the two hands, one on each side of the neck. The submaxillary and cervical regions alone were palpated and all cases were marked as negative in which enlargement of the lymphatic glands was not instantly apparent. It was found that after the age of twelve years the percentage of cases of enlarged glands rapidly declined, showing that the enlargement itself is in most cases—whatever be its cause—of a temporary nature. The percentage of such cases among about 240,000 children examined in 1913, was 10.5, falling to 8.8 in 1914.—*Gland Index in Tuberculosis, A. Lankester, Indian Jour. of Med. Research, October 1916.*

Diagnosis of Thoracic Adenitis.—The authors submit an article and illustrative x-rays appended by a very complete bibliography. Sukiennikow is quoted as having found the right bronchial glands most numerous and Hall has located the bifurcation of the trachea at the right border of the sternum at the level of the intervertebral disk between the fourth and fifth vertebrae. Harbitz found in 42 per cent of 275 autopsies in children tuberculous glands. Wollstein found in her series the largest glands on the right in 74 per cent and Boltz found but three cases with nontuberculous bronchial glands in 101 fatal cases of pulmonary tuberculosis in children. The authors lay stress on the indefinite character of the symptoms.

Signs which have been described as of value in the diagnosis of this condition are: The enlargement of the superficial veins of the thorax, irregular pupils, the Eustace Smith sign (a venous hum or bruit over the root of the neck on full extension of the head), d'Espine's sign (a prolongation of the whispered voice sounds below the first thoracic vertebra), paravertebral dullness, exaggeration of the breath sounds at the apex. The x-ray plate and fluoroscope are of great value.

The authors found Smith's sign in 2 out of 98 positive cases and do not believe that d'Espine's sign is as valuable as most of the other signs obtained by auscultation and percussion. They have found vertebral and paravertebral dullness to be more constant and therefore more reliable than d'Espine's sign.

Smith and Sweet on the contrary corroborated d'Espine's sign with the x-ray in 90 per cent of their cases.

Da Costa has very commonly corroborated the presence of vertebral dullness below the 4th dorsal vertebra by the finding of glandular shadow by the x-ray.

Fetterholf and Giddings from the study of frozen sections believe it highly problematical that the presence of enlarged bronchial nodes can be accurately diagnosed by percussion on account of their close relationship to the arch of the aorta, thymus and other structures.

The fluoroscope may show an acutely enlarged gland which, not having any calcium deposits, would make no impression on a plate.

The authors very sanely conclude that the subject though very important affords a problem still unsolved, but that no study of this sort of a case is complete without repeated x-ray examination.—*The Diagnosis of Thoracic Adenitis, Floyd, Bouteim and George, Internat. Clin., iii, 26.*

Tuberculosis of Bronchial Glands.—It seems more than probable that the first chapter in the story of pulmonary tuberculosis is often written in the bronchial glands. The pressure of enlarged tuberculous glands upon the trachea or bronchi may so compress their blood vessels that

engorgements may result in rupture with hemoptysis. These hemoptyses may persist for years with no physical signs in the lungs. Tuberculosis of the bronchial glands may cause tracheobronchial stenosis with consequent asthmatic, emphysematous, atelectatic, bronchiectatic, bronchitic, and pneumonic conditions of the lungs, which are highly favorable to the growth of tubercle bacilli. Just as enlarged inguinal glands cause edema of the lower extremities, and just as tuberculosis of the cervical glands causes edema of the face, so does pressure from enlarged glands within the thorax cause dilatation of the veins of the face and of the chest or injury to the recurrent laryngeal, vagus, phrenic, and sympathetic nerves. The stasis and slowing of the circulation in the regions of the lung near the hilus predispose to the establishing of tuberculous processes there and make the root of the lung the logical site for the beginning of tuberculous processes. Bythell insists that in children pulmonary tuberculosis invariably begins at the roots of the lungs. Out of 330 successive cases of children examined clinically and radiologically he had never seen a single case in which the disease had not obviously originated at the hilus of the lung, nor met one in which the sole or even the primary lesion had been at the apex.

In the treatment of tuberculosis of the lungs the bronchial glands must first be healed. Long after the physical signs in the lungs have improved, the affected spots in the bronchial glands remain dangerous and difficult to control.—*The Relation of Tuberculosis of the Bronchial Glands to the Diagnosis and Treatment of Tuberculosis of the Lungs, Mary E. Lapham, Am. J. M. Sc., December 1916, clii, no. 12.*

Pleural Tuberculosis.—Ameuille has found the serous membranes involved in 270 out of 2600 tuberculous soldiers. Isolated tuberculous pleuritis was the most frequent, but in a number of the cases the peritoneum, pericardium, meninges or synovial membranes were involved likewise or alone. As a rule, the pleurisy without effusion is the first process. Scarcely any of the men were over 24. The lung did not become involved often. The infection in the pleura is usually the result of the fanning into a flame of some old glandular, mediastinal or pleural process; direct contact infection is not needed to explain it.—*Pleural Tuberculosis and Tuberculous Polyserositis, P. Ameuille, Ann. de. Med., January-February, 1917.*

Relation of Pleurisy to Tuberculosis.—Two series of cases dating from 1905 until the present time were analyzed. In the first series of 1767 cases of pulmonary tuberculosis, 35 per cent gave a history of pleurisy. In the second series of 518 cases, 52 per cent gave a history of previous pleurisy. Including simple adhesions with other more marked changes in the pleura, pleuritis was found in 74.4 per cent of 215 cases. Pierce believes that, particularly on the Western coast, where the water is so free from minerals, a condition of demineralization is very likely to prevail in the preincipient stage of pulmonary tuberculosis and is probably a predisposing factor. He has seen many cases of pleurisy with effusion where there was no history of pain, the only inconvenience which would be recalled by the patient being a slight cough and more or less restricted breathing, with perhaps fever and an occasional chill and sweat.—*Relation of Pleurisy to Tuberculosis, E. A. Pierce, Northwest Med., March 1917, 1, no. 3.*

Special Form of Tuberculous Pleurisy in the Army.—Piery describes a benign relapsing type of pleurisy, which has been observed during the present war, and described under different designations. It is not peculiar to the army for the author recognized its existence in civil practice in 1909. Three forms of pulmonary tuberculosis have been seen in the soldiers in about the following ratio: tuberculous pleurisy 60, apical fibrous pulmonary tuberculosis 30 and ulcerative tubercle with bacilli in the sputum 10. Victims of the first-named complain of cough and oppression, or more frequently of oppression and palpitation, with lumbago and digestive disturbances. After a little treatment for the last-named, they are sent back to the trenches, but soon reappear. Every week sees them worse with mental and physical depression. Various diagnoses are made —palpitation, effort dyspnea, endocarditis, myocarditis, anemia, general debility, suspicious apices, gastritis, neurasthenia, etc. Cross-questioning will perhaps bring out the existence of a stitch pain on deep inspiration or cough, and of a slight, dry cough with one or two morning raisings from the bronchi. There is a slight evening temperature rise. Auscultation is unsatisfactory, but if one follows along the fissures of the lung one may obtain a friction sound, pure or associated with râles. These indicate a fissural pleurisy which may be bilateral. The nature of the process cannot be proved and in any case the affection is benign and runs its course in two or three weeks. The tendency to relapse, however, at once suggests tubercle. In certain

cases the subjacent lung tissue is sensibly involved, stethoscopic signs are much more evident and the general symptoms more numerous and varied. Not rarely in both simple and complicated pleurisy the latter is masked and the patient is treated for dyspepsia or neurasthenia; or perhaps the symptoms are referred to the apices and bronchi. Let one once bear in mind the frequency of tuberculous pleurisy and the correct diagnosis will be less often missed. The tuberculous nature of a malady is usually suspected from the well known tetrad of symptoms—anorexia, emaciation, moderate fever and anemia. A radiograph may show enlarged tracheobronchial glands. Recently the author examined a dozen soldiers with suspected tuberculous pleurisy and obtained this find in every one. Beginning apex tuberculosis may coexist. So characteristic is this fissural pleurisy that the author does not believe anything can be gained by the von Pirquet test. He believes that a shallow layer of pulmonary alveoli is always involved, with the pleura.—*La pleurite tuberculeure a repetition, Piery, La Presse Med., December 21, 1916.*

Tuberculous Asthma.—Report of 2 cases of asthma in men of 28 and 43, both with signs suggesting latent tuberculosis although no focus could be found. Both were given tuberculin treatment on the basis that the asthma was an anaphylactic phenomenon from the tubercle bacilli toxins. The improvement was marked in both, and the asthma soon disappeared entirely. These were the cases showing the most striking benefit in the shortest time of all in a much larger total experience.—*Tuberculous Asthma; 2 cases, J. Franguelli, Semana Medica, 1916, xxiii, 19. no. 49.*

Spontaneous Pneumothorax.—Bonsdorf concludes from his experience in nineteen cases that treatment should aim to transform the spontaneous pneumothorax into a seropneumothorax or serothorax, and then, as soon as the fistula has healed, to aspirate the effusion and introduce nitrogen in its place, keeping up the artificial pneumothorax as long as conditions require. This method was applied in three of his cases and proved completely successful in two. In the third case the fistula refused to heal.—*Treatment of Spontaneous Tuberculous Pneumothorax, A. v. Bonsdorf, Finska Läkaresällskapets Handlingar, September, 1916, lviii, no. 9.*

The Ventilation of the Lungs in Pneumothorax.—In his well known essay on the factors of safety in the living organism, Meltzer (Harvey lecture 1906-1907) called attention to Nature's extravagance in furnishing most of the important organs with a large surplus of tissue above the amount necessary to perform their ordinary physiologic tasks. This provision is a great blessing, serving to avert many a disaster which might follow impairment or a greater scantiness of functional matter. Meltzer reminded us that life may continue though a great part of the lungs is destroyed, if only the disease which caused the destruction comes to a standstill. In some cases of pneumonia one lung can be entirely consolidated without seriously impairing the process of ventilation. Furthermore, a patient whose throax is freely opened to evacuate a one-sided pleural abscess has less dyspnea after the opening than before. In empyema, as in pneumonia, it is essentially the infection and intoxication with their reactions which cause the apparent disturbance in the respiratory mechanism, and not so much the mechanical interference with the ventilation of the corresponding lung. Since the classic experiments of Regnault and Reiset, many investigators have stated that compression of one lung, or a unilateral pneumothorax, exerts little influence on the respiratory exchange of gases.

An even more specific and, so to speak, quantitative study of this question has been reported in connection with an attempt to find out in man what effect a great reduction in the functioning lung surface would have on the various factors of respiration. The observations were made in persons with pneumothorax by Means and Balboni (Jour. Exper. Med., 1916, 24, 671) at the Massachusetts General Hospital, Boston. They make it evident that at rest all the factors of respiration, gaseous exchange, carbon dioxid, tension, and the mechanical factors, are normal in persons with a collapsed lung; that the well-known reaction to carbon dioxid resulting in more rapid breathing is normal up to the point at which respiration is trebled or sometimes quadrupled; but that beyond this point a limit may be reached.

Here again is clear evidence that the ventilation of the lungs can be accomplished in an entirely normal manner in spite of a greatly reduced vital capacity. One lung is as efficient as two except when an increase at least threefold in contrast with normal ventilation is called for. Means and Balboni have shown as the only difference between normal persons and persons with a collapsed lung that the latter when called on to increase their ventilation reach their limit a little sooner than the former. Furthermore, the histories of patients bear out what might be expected in view of the

foregoing, namely, that there will be no dyspnea in pneumothorax except after moderate exertion. Thus does the liberal surplus of functional tissues prevent disease from hampering our activities or spoiling the pleasure of living.—*Editorial, J. Am. M. A., February 17, 1917, lxviii, no. 7.*

Bilateral Mammary Tuberculosis.—The patient was an unmarried woman of fifty years, with no evidence of tuberculosis elsewhere than in the left breast. The lesion had been developing for seven months and was as large as a hen's egg. The entire breast was resected and the otherwise healthy woman rapidly recovered. She returned a year later with a similar tumor in the right breast. It had been noted for two months and this breast also was removed. Scanty tubercle bacilli and the characteristic tissue findings were demonstrated in each of the lesions. This isolated bilateral tuberculosis of the breast is very rare, still more so in a virgin.—*Sopra un caso di tubercolosi bilaterale della mammella, Gilberti, Policlin, November 1916.*

Gastric Onset of Pulmonary Tuberculosis.—Frequently patients with gastric or intestinal disturbance ultimately develop signs and symptoms of tuberculosis. These cases are often overlooked. Attention should be paid to any slight symptoms referable to the respiratory tract, particularly in neurasthenic patients. Cases coming under observation for and not responding to gastric treatments should suggest the possibility of tuberculosis, and a fluorscopic examination should be made.—*The Gastric Onset of Pulmonary Tuberculosis, A. Bassler, N. York M. J., March 10, 1917, cv, no. 10.*

Hepatic Insufficiency in Pulmonary Tuberculosis.—Studies of tuberculosis in various climates have shown that certain types of hepatitis and hepatic cirrhosis stand in close relationship with tuberculosis. With these lesions we have at present nothing to do. It is, however, a fair inference that such cases, rare or otherwise, must have been preceded by a long period of slight hepatic insufficiency. Moreover it is not unlikely that in many other cases this insufficiency remains slight, *i.e.*, does not progress to cirrhosis. In a recent Paris thesis by Roubakine (1916) much work along this line is made public. The conclusion is that nearly every tuberculous subject exhibits evidences of such insufficiency. When he begins to emaciate, cough, run evening elevation of temperature, sweat, etc., and even when he simply has "weak lungs," or merely a bad family history, we should investigate the state of the hepatic functions. The liver percusses normally, but the stools may show an absence of bile, and the entire digestive tract may exhibit derangement of function (diarrhea, anorexia). The alimentary glycosuria test should be made to determine the state of the glycogenic function of the liver. In short, each single test of the various hepatic functions should be carefully made. Whenever mild insufficiency has been shown to exist, we may expect to see gross anatomical changes follow. The organ becomes enlarged to percussion, and the peculiar anorexia and malassimilation of tuberculosis must be unfavorably influenced. Diarrhea of a persistent type is associated with slight enlargement of the liver.—*Editorial, Med. Rec., January 20, 1917, xci, no. 3.*

Ileo-Caecal Tuberculosis.—There are two varieties, an ulcerative and a hypertrophic form. In the first the whole of the ileo-caecal region is lost in a mass of adhesions, interspersed with caseous matter, and even purulent tuberculous cavities, communicating sometimes with the intestinal canal. It is not capable of radical removal, but may often be relieved by incision and drainage, or by exclusion through anastomosis. The second form is the so called tuberculous tumor of the caecum, in which the latter appears increased in volume, more or less mobile in the iliac fossa, and often included in a fibro-adipose mass of 3 to 4 cm. thickness. It is easily mistaken for cancer and is readily amenable to surgical intervention. This form is rarely accompanied by other active foci of the disease, but is a primary focus resulting from an infection by way of the intestinal contents. Where ileo-caecal tuberculosis occurs as a complication of pulmonary disease, the ulcerative entero-peritoneal type is found. This type is associated with diminished resistive power and leads to perforation with peritonitis or abscess formation; while the hypertrophic type progresses toward scar formation and mechanical interference by tumor formation and obstruction. The histological picture of this variety suggests the name "fibrous hyperplastic tuberculosis of the caecum" rather than hypertrophic. The two cases reported in the paper belong to the hyperplastic form. The onset was slow, usually associated with vague indefinite pains in the right iliac fossa, and symptoms of intestinal indigestion. At this stage it is difficult to rule out chronic appendicitis. When to these symptoms are added an increasing

constipation with attacks of colicky pain, and the discovery of a movable tumor, the probability of malignant disease with stricture is suggested, especially as there is usually no other sign of tuberculosis in the individual. There is usually no fever and leucocytosis. In the hypertrophic type, resection with lateral anastomosis is the operation of choice.—*Hypertrophic Ileo-Caecal Tuberculosis, H. Gage and E. L. Hunt, Boston M. and S. J., February 22, 1917, clxxvi, no. 9.*

Appendicitis and Pulmonary Tuberculosis.—Appendicitis and intestinal tuberculosis are the two organic conditions in the intestines which are most frequently encountered among tuberculous patients. The majority of cases have the classical symptoms of appendicitis. Some, however, are atypical. There is one type with more or less chronic symptoms of intestinal indigestion. Another type occurs as a mild attack with moderate cramps in the abdomen which may be attributed to the taking of milk. A third type is atypical in that it is accompanied by diarrhea. Among 727 tuberculous patients treated from 1905 to 1916, there were 43 cases of appendicitis, 5.9 per cent. The percentage was higher among males, 6.8 against 4.6 in females. The incidence of age was the same as in non-tuberculous individuals. Of the 43 cases, 28 were operated on, and 15 recovered without operation. Three of the 28 operated cases died, two on the third day and one after four months. Chloroform was used in one of the first two; nitrous oxide and oxygen in the other two. Comparing the results obtained with statistics of non-tuberculous cases, it is seen that patients with pulmonary tuberculosis stand the operation for appendicitis exceedingly well. In 25 per cent of the operated cases well defined tuberculosis of the appendix was found. These were moderately or far advanced cases of tuberculosis. The operation seemed to have no bad effects on the lungs. In the use of an anesthetic, local anesthesia is to be preferred, but where this is not feasible, nitrous oxide-oxygen anesthesia is the general anesthetic of choice. Chloroform, when given by a reliable anesthetist is fairly safe and ether by drop method may also be used. Spinal anesthesia has not been employed. In considering the advisability of operation, cases of acute appendicitis are to be regarded as in other patients without reference to their pulmonary condition. In mild or chronic cases the pulmonary condition should be considered. If the physical condition warrants it operation should be performed. Many such patients improve remarkably after removal of a diseased appendix.—*Appendicitis and Pulmonary Tuberculosis, H. M. Kinghorn, J. Am. M. Ass., December 16, 1916, lxvii, 1842, no. 25.*

Tuberculosis of Kidney and Bladder Clinically Cured Without Operation.—This report refers to patients who have presented themselves with both sides infected or who absolutely refused to be operated. With the best hygienic care, compatible with the patients' occupations, cautioning them not to overdo physical exercise, using extreme gentleness in the care of the cystitis and with small doses of tuberculin regularly given and carefully increased, not necessarily to the highest point of toleration for the individual patient, but to the point of greatest clinical gain, a great many may be relieved, and possibly cured, and certainly may be made more comfortable. Of these fifty patients, 90 per cent have been able to keep at their work during the course of treatment or were able to return within a very few weeks. Two patients developed tuberculous epididymitis in the course of their treatment. Great care was taken not to get a reaction with the tuberculin. In the average case 1/75,000 mg. was given twice a week and so gradually increased that there was never a local or general reaction. In those cases, complicated by lung infections, this intitial dose was reduced to 1/750,000 mg. As a guide for increasing the dose in the majority of the cases, Dillingham relied on the following: a feeling of well-being and less of the tired feeling, increase in weight and appetite, improvement as to frequency either day or night, or both. Along with careful diet and hygienic measures, Dillingham is a a firm believer in the use of silver nitrate for bladder irrigations, beginning with a pint of a 1/50,000 solution in distilled water, the rule being not to cause irritation either from the strength of the silver or the rapidity of its injection. In increasing the strength of the silver, which is done as rapidly as possible, the bladder should never burn.—*Report of Fifty Cases of Tuberculosis of Kidney and Bladder Clinically Cured without Operation, F. S. Dillingham, Calif. State Jour. of Med., March 1917.*

Extirpation of the Bladder for Tuberculosis.—Rosenbach reports a successful case of this intervention. As a rule the latter shows a high operative mortality and poor end results in survivors. Of recent years two-stage operations have come into use. In the author's case the female pa-

tient showed a condition of the bladder which was at first regarded as cancer but which proved to be a severe tuberculosis of the bladder and urethra. Patient was sixty-one years old and begged for operative relief. Catheterism was barely practicable and cystoscopy out of the question. Under lumbar anesthesia the author cut down upon the bladder and detached it from the uterus and vagina until he arrived at the ureters. After the blood vessels had been ligated the latter were divided at the bladder. After opening the peritoneum and tamponing the wound, the bladder was brought forward and opened at the vertex. Save for an area in the rear the size of a silver dollar, the mucosa of the organ was entirely involved and the bladder, with the exception of this intact portion, was extirpated. The ureters were implanted into the vagina, and the cavity which had held the bladder was tamponed and drained. There was no severe reaction from the operation and convalescence was smooth. At the end of two months the cavity had almost closed. The ureters never gave any trouble and the patient does nicely with a urinal. Kolpokleisis was not indicated. The vagina had to be irrigated frequently.—*Extirpation der Blase wegen Tuberkulose, Rosenbach, Zentralbl. f. Chir., November 25, 1916.*

Bone and Joint Tuberculosis.—The total number of cases investigated by Griffith is 155. This series shows that infection in bone and joint tuberculosis may be acquired by way either of the respiratory or the alimentary tract. The total number of strains isolated from 141 patients is 216, of which 82 (representing 73 viruses) were obtained direct. 25 yielded cultures of bovine, 111 of human tubercle bacilli and 5 were atypical.—*Human Bone and Joint Tuberculosis, A. S. Griffith, J. of Path. and Bacteriol., December 1916, xxi, no. 1.*

Hip Tuberculosis in Adults.—A history of rheumatism or sciatica is often obtained. The process may be primary in the bone or in the synovials. Among the earliest symptoms is stiffness of the joint in the morning, which at first wears off as the day advances; then increases in severity, becoming more or less constant; besides there is pain in the hip and knee which is often nocturnal, and finally a limp develops. Fairly early findings are: atrophy of the gluteus and thigh muscles, muscular rigidity and spasm, pain on motion, and shortening but only when the head of femur or the acetabulum are involved. Fever is absent or slight; swelling, deformity and abscess formation occur late. The x-ray is of value in diagnosis only when there is involvement of bone. The prognosis should be guarded; ankylosis in good position is about all one expects, though early cases may give very gratifying results. In the presence of visceral tuberculosis the prognosis is less encouraging. The treatment consists of general hygienic measures and immobilization. Weights are used for the relief of pain; they are gradually increased and are used in conjunction with Buck's extension with counterextension. Extension is also used to correct deformity, the direction of the pull being changed gradually toward normal. If there is ankylosis in a good position with shortening, elevate the shoe to compensate for same; if there is ankylosis with deformity, the latter is corrected by traction. Abscesses should be incised and drained; this method is superior in that it avoids destruction of tissue, sepsis, new foci and amyloid degeneration. Beck's bismuth paste in the treatment of sinuses has given the best results. After freedom from pain for three months and after deformities have been overcome, splints or plaster of paris spica casts and apparatus to overcome shortening are applied. If pain returns, casts and crutches must be returned to.—*Tuberculosis of the Hip Joint in Adults, H. R. Tarbox, Hosp. Bull. Dept. Pub. Char. N. Y. City, January 1917, I, no. 2, 66.*

Tuberculosis in Young Infants.—Combe reiterates the vital importance of preventing the infection of infants during the first eighteen months of life, saying that infection between the twelfth and eighteenth months practically condemns the child to death within six or eight months. After the eighteenth month, tuberculous infection induces merely glandular disease, local and closed, against which the child is admirably armed. It is armed against this to such a degree that only some intercurrent disease or deplorable conditions as to hygiene entail generalization of the tuberculous infection and death. The nursling must be protected against both bovine and human tubercle bacilli. Cow's milk must be boiled or pasteurized. This protects against bovine infection, but to protect against infection from some tuberculous member of the family requires much time, much money—for antiseptics are expensive—and much space. The child should be isolated in a well ventilated, sunny room. A single moment's forgetfulness, and the whole edifice of asepsis crumbles; the child is infected. Besides this, the isolation of the child seems so

hard and cruel to the family that it is seldom strictly carried out, but unless the young child is kept away from the bacillisower and from the articles contaminated with his bacilli the child's doom is sealed. The milk of a tuberculous mother contains more or less toxins, even aside from the danger from direct contact and the poor quality of such milk. The physician has to appreciate these dangers before he can summon up courage to insist that the consumptive mother must not suckle her babe. She must never hug it, never caress it, never take it on her lap, and must restrict all contact with it to the strictly necessary, and never touch it without having first disinfected her hands with soap and some antiseptic solution. She must sterilize her mouth several times a day with an antiseptic solution, and always hold a handkerchief before her mouth as she speaks, sings, coughs or sneezes, when she is in the room where the child is kept, whether or not it is in the room at the time. All dishes and articles should be boiled after using, and the table and body linen thrown into boiling water every day and be further sterilized by ironing with a very hot iron. All dusting in the room should be done with a cloth slightly moistened with turpentine, the walls and floors washed with an antiseptic solution. The infant should creep and play only on a freshly laundered sheet in a railed space, both indoors and out, and it should be given only sand and little stones to play with, all carefully boiled and dried in the sun. All its playthings, rubber nipples, etc., should be boiled each time before being given to the child.

These measures are all theoretically possible and have been carried out in numerous instances, but as a rule the only safe way is to remove the child from its mother immediately after birth or remove the consumptive from the family circle. In France, Germany, Switzerland and elsewhere provision has now been made for institutions where infants exposed to danger of this kind at home can find shelter and safety.

In discussing means to augment the resisting powers Combe describes how he gives sunbaths to very young infants, graduating the heliotherapy to their size and strength. He also gives exposures to the actinic rays filtered through a sheet of special blue glass, allowing only the useful rays to pass. He begins with five minute exposures, front and rear, the lamp at a distance of over 3 feet. The sittings are gradually lengthened to an hour front and an hour back, the distance 1½ feet. The natural or artificial heliotherapy improves the general condition but does not seem to act directly on the tubercle bacilli or their products. The diet is regulated according to the indications furnished by analysis of the infants' stools. The natural heliotherapy is applied according to Rollier's technic.—*Treatment of Tuberculosis in Young Infants. Prophylaxis and Prevention of Generalization of Tuberculous Infection, Combe, Le Nourisson, November, 1916, IV, No. 6.*

MULFORD
FOR THE CONSERVATION OF LIFE
LABORATORIES

The Choice of Tuberculins

1. **For diagnostic purposes** whether administered by the cutaneous, percutaneous, intracutaneous or subcutaneous method, the original tuberculin of Koch ("O T") is recognized as the standard.*

2. **In the treatment of tuberculosis** the choice of tuberculins should properly be restricted to the preparations of which we have the fullest information.

Based upon this consideration

Old Tuberculin—"O T"
Bouillon Filtrate—"B F"
Bacillen Emulsion—"B E"

meet our present theoretical requirements. Their selection is fully justified by experience, and by advocating their use to the exclusion of other preparations the perplexity of the practitioner in planning a program of treatment of his tuberculous patients may be greatly lessened.*

Mulford Tuberculins

The following Tuberculins are undiluted

Tuberculin, Old ("O T") in 1 Gm. vials	$1 00
Tuberculin, Denys (Bouillon Filtrate, "B F")† in 1 Gm. vials	1 50
Tuberculin "R" (Tuberculin Rest, "T R")† in 1 Gm. vials	1 50
Tuberculin, Bacillen Emulsion ("B E"), in 1 Gm. vials	1 50
Moro Reaction, Tuberculin ointment for Moro cutaneous reaction. In 1 Gm. tubes, 4 tests to the tube	1 00
Von Pirquet Test. Tuberculin, Old. In packages of one capillary tube with control	25
In packages of 3 capillary tubes	65
10 capillary tubes with control	1 25
Intradermal Tuberculin Mulford	
In intradermic syringes, single test packages	75
In intradermic syringes, 5-test packages	2 50
In vials of 50-test packages	12 50
Tuberculin Scarifier, similar to that used by von Pirquet	50
Syringes, for administration of Bacterial Vaccines and Tuberculins. All glass with two needles	1 50

TUBERCULIN DILUTIONS

Single vials of Serial Dilutions "O T," "B F," "T R" or "B E"	50

We Also Furnish

Proteose Free Tuberculin, i.e., "OT," from which the proteins have been precipitated by alcohol.

Old Tuberculin Precipitate ("O T P") "O T" precipitated by alcohol and redissolved in salt solution, reprecipitated by alcohol and dried in vacuum and powdered—used for the ophthalmic tuberculin reaction for cattle.

* "The Choice of Tuberculins," by Benjamin White, Otisville, N. Y., Department of Health, City of New York. Read at the annual meeting of the Medical Society of the State of New York, at Saratoga Springs, May 18, 1916.

† Human or bovine type.

[Literature sent on request

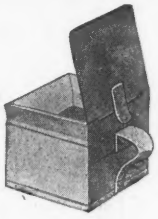
H. K. MULFORD CO., Philadelphia, U. S. A.

25768 **Manufacturing and Biological Chemists**

HYGIENIC PAPER SPECIALTIES

Paper Sputum Cups and Holders—Pocket Sputum Cups—Paper Cuspidors—Paper Napkins—Paper Towels—Drinking Cups

STONE & FORSYTH CO. **Boston, Mass.**



PRESCOTT, ARIZONA ALTITUDE 5350 FEET

PAMSETGAAF SANATORIUM

FOR TUBERCULOSIS

JOHN W. FLINN, M.D., Medical Director

Pamsetgaaf is a quiet cottage sanatorium for the treatment of all forms of tuberculosis. It is beautifully situated among the pines in the mountains of Northern Arizona, and offers all the advantages of careful scientific treatment combined with the pure invigorating air of the Southwest in the midst of attractive surroundings. Especial facilities for surgical tuberculosis. Write for illustrated booklet.

JOSIAH F. REED, Business Manager

VON ORMY COTTAGE SANITARIUM

For the Treatment of Tuberculosis

VON ORMY, TEXAS

I. S. KAHN, A.B., M.D., Medical Director
W. R. GASTON, Business Manager
F. C. COOL, Assistant Manager

An institution designed for the proper care of tubercular patients at moderate rates.
Splendid all year 'round climate.
Beautifully located on the Medina River near San Antonio. Our own dairy and egg supply.
Tuberculin, autogenous vaccines and artificial pneumothorax used where indicated.
Hopeless last stage cases not admitted.
Rates: $15.00 and $18.00 per week.
Write for booklet.

THE **SPRINGFIELD OPEN AIR COLONY**

A SANATORIUM AND SCHOOL FOR THE TUBERCULOUS WHERE **HAPPINESS** IS REGARDED AN ABSOLUTELY ESSENTIAL PART OF TREATMENT

NOT AN INSTITUTION.
NOT A HOSPITAL.
NOT A LABORATORY.
NOT A SCIENTIFIC WORKSHOP.

¶ A SANATORIUM WITH A PERSONALITY WHICH RECOGNIZES THE PERSONALITY OF THE PATIENT.

¶ NO MORE PATIENTS ACCEPTED THAN CAN RECEIVE THE CONSTANT PERSONAL ATTENTION OF THE MEDICAL DIRECTOR.

¶ RATES LOWER THAN ANY OTHER MID-WESTERN SANATORIUM GIVING THE SAME QUALITY OF INDIVIDUAL SERVICE.

Circular on request

GEORGE THOMAS PALMER, M.D.
Director
SPRINGFIELD, ILLINOIS

—if you like

—this number

Tell your Friends

and

Get them to Subscribe

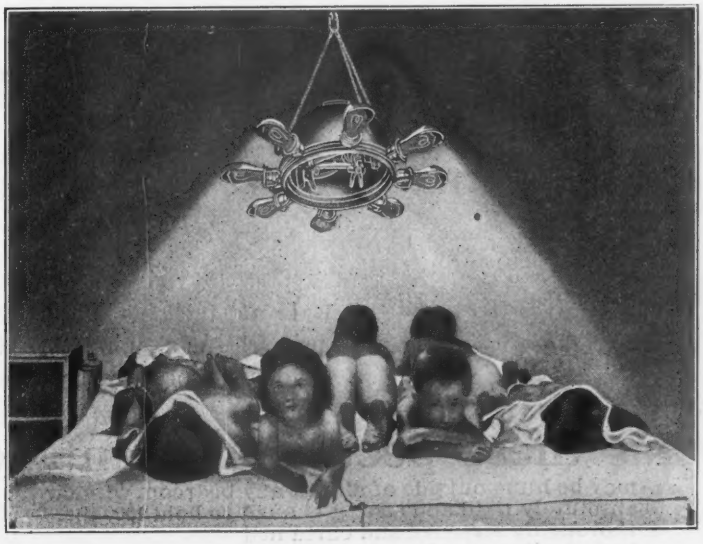
We will send sample copies to some of your friends if you will send us their names and addresses.

Why not get up a club?

Ask us for our club rates.

American Review of Tuberculosis
105 East 22d Street
New York City

PHOTO TAKEN IN SURGICAL CLINIC UNIV. OF MARBURG



WRITE FOR BOOKLET R 50 TODAY SENT FREE

SCROFULOUS CHILDREN RECEIVING LAST RADIATION WITH HERAEUS SUN LAMP BEFORE DISCHARGE. OBJECTIVE SYMPTOMS HAVE ENTIRELY DISAPPEARED.

HANOVIA CHEMICAL & MFG. CO.
NEWARK, N. J.

IMPORTANT PUBLICATIONS

Tuberculosis Dispensary Method and Procedure

PREPARED FOR

The National Association for the Study and Prevention of Tuberculosis by F. Elisabeth Crowell, Executive Secretary, New York Association Tuberculosis Clinics with an introduction by James Alexander Miller, M.D.
Invaluable to those engaged in dispensary work. Price, 25 cents postpaid

Tuberculosis Hospital and Sanatorium Construction

WRITTEN FOR

The National Association for the study and prevention of Tuberculosis by Thomas Spees Carrington, M.D.
Invaluable to any one having to do with the design or construction of institutions for the care of the tuberculous.
Third Edition, Revised and Enlarged, with special Chapter on Children's Buildings. Price, 62 cents postpaid.

Tuberculosis Directory, Contains a list of

institutions and other agencies in the United States and Canada. Also much valuable information as to rates and capacities of the various sanatoria.
Price, 60 cents postpaid.

The National Association for the Study and Prevention of Tuberculosis
105 EAST TWENTY-SECOND STREET, NEW YORK

The Korff Sleeping Porch

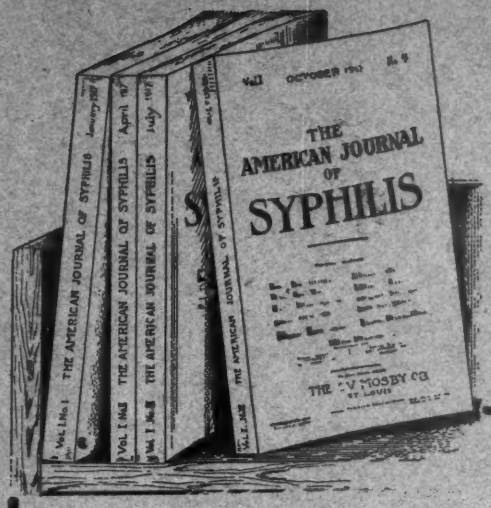
Is a detachable balcony designed primarily for sleeping and sitting out of doors, especially for tuberculous patients.

It has these peculiar advantages

- may be hung outside of almost any bedroom window
- absolutely rigid and strong enough to hold 1000 lbs.
- thoroughly screened and curtained
- looks well on any house
- can be easily detached and attached
- gives perfect security and privacy
- price is reasonable

Write for illustrated booklet showing prices and uses

KORFF MFG. CO.
327 East Franklin Ave., Lansing, Michigan



Have You Subscribed?

American Journal of Syphilis

A quarterly journal devoted to the study and prevention of syphilis. Published during the months of January, April, July and October. $5.00 per year. $5.80 in foreign countries. Each number contains from 175 to 260 pages with many illustrations in black and white and in colors.

MANAGING EDITOR
Lloyd Thompson, M.D., Hot Springs, Ark.

ASSOCIATE EDITOR
Wm. H. Deaderick, M.D., Hot Springs, Ark.

The Parasitology of Syphilis
Hideyo Noguchi, M.D., New York.

The Pathology of Syphilis
Eugene L. Opie, M.D., St. Louis.

Syphilis and Dermatology
Udo J. Wile, M.D., Ann Arbor, Mich.

The Therapy of Syphilis
Jay F. Schamberg, M.D., Philadelphia.

Syphilis and Neurology
Joseph Collins, M.D., New York

Syphilis and the Eye
Myles Standish, M.D., Boston.

Congenital Syphilis
W. W. Butterworth, M.D., New Orleans.

The Serology of Syphilis
Maj. Chas. F. Craig, U. S. Army.

Syphilis and the Ear, Nose and Throat
Robert Levy, M.D., Denver.

Syphilis and Internal Medicine
Lewellys F. Barker, M.D., Baltimore.

Syphilis and Gynecology and Obstetrics
F. W. Lynch, M.D., San Francisco.

Syphilis and Urology
E. L. Keyes, Jr., M.D., New York.

The Social Aspects of Syphilis
Wm. A. Pusey, M.D., Chicago.

Roentgenology of Syphilis
R. D. Carman, M.D., Rochester, Minn.

Surgery of Syphilis
Rudolph Matas, M.D., New Orleans, La.

Conservatively Speaking there are 10,000,000 Syphilitics in America

This disease touches intimately every practitioner in any department of medicine. To recognize its wide ramifications makes you a more capable diagnostician, a more dependable surgeon, and a more successful therapeutist.

The foremost medical thought in America is contributing to the success of this undertaking. For your benefit, the crystallized experiences of workers in every department of medicine touching upon syphilis is brought to a focus in this journal

A subscription to the American Journal of Syphilis puts you in direct touch with this work. Don't delay sending in your subscription. Remember—700 to 900 pages during the year, profusely illustrated. Sign attached coupon and mail today and you will be assured of getting the January, April, and July issues (Vol. I, Nos. 1, 2, 3), but these will be exhausted soon.

The C. V. Mosby Company—Publishers

801-807 Metropolitan Building ST. LOUIS, U.S.A.

(Send for Catalogue of Medical Publications)

CUT HERE AND MAIL TODAY

Am. Rev. of T.
THE C. V. MOSBY CO.
St. Louis, Mo.

Gentlemen:
Please enter my subscription to The American Journal of Syphilis, beginning with the January, 1917, issue, for which I agree to remit on receipt of bill. Published quarterly, $5.00 per year.

Name.....

Address.....

.....

Cragmor Sanatorium

COLORADO SPRINGS :: :: COLORADO

Altitude 6,200 feet

FOR THE

Treatment of Tuberculosis

MAIN BUILDING

This building together with the cottages and bungalows has *every convenience for the comfort and scientific care of patients.*

Each patient has *private apartment and* sleeping porch with *private baths.*

Cragmor is located in the shelter of Austin Bluffs 2½ miles from Colorado Springs. *Its site,* especially chosen, *affords a wonderful view of Pikes Peak* and the Rampart Range of the Rockies.

The climate and altitude of this region have made it *one of the best known resorts* for the treatment of Tuberculosis. The constant *sunny days of Fall and Winter make "taking the cure" pleasant and comfortable.*

MEDICAL DIRECTORS

ALEXIUS M. FORSTER, M.D. - - - - - *Physician in Chief*
GERALD B. WEBB M.D. and GEORGE BURTON GILBERT, M.D. - *Consultants*
FRANK M. HOUCK, M.D. - - - - - - - *Superintendent*

For full particulars address the Physician in Chief